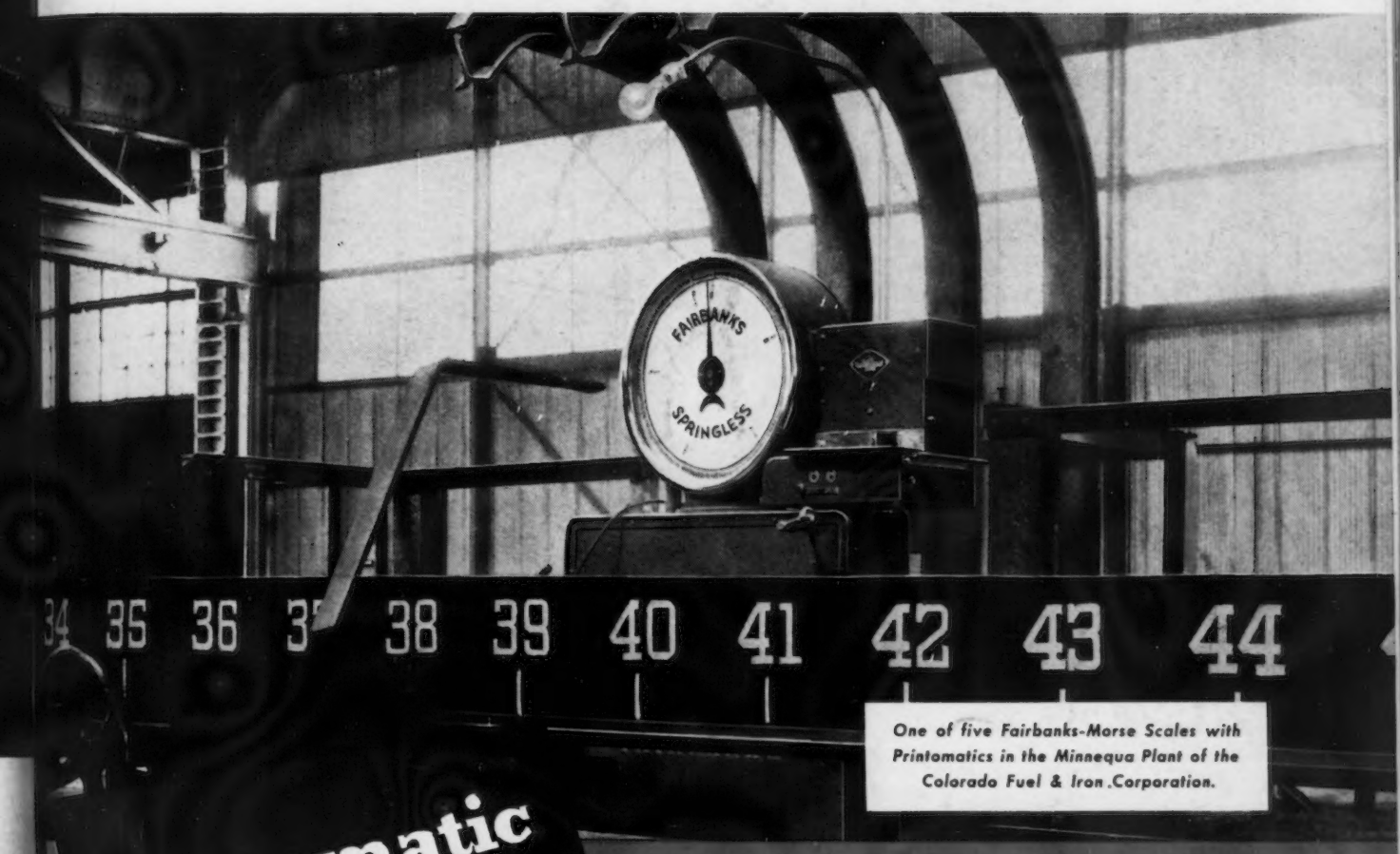
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The IRON AGE

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Automatic Accuracy

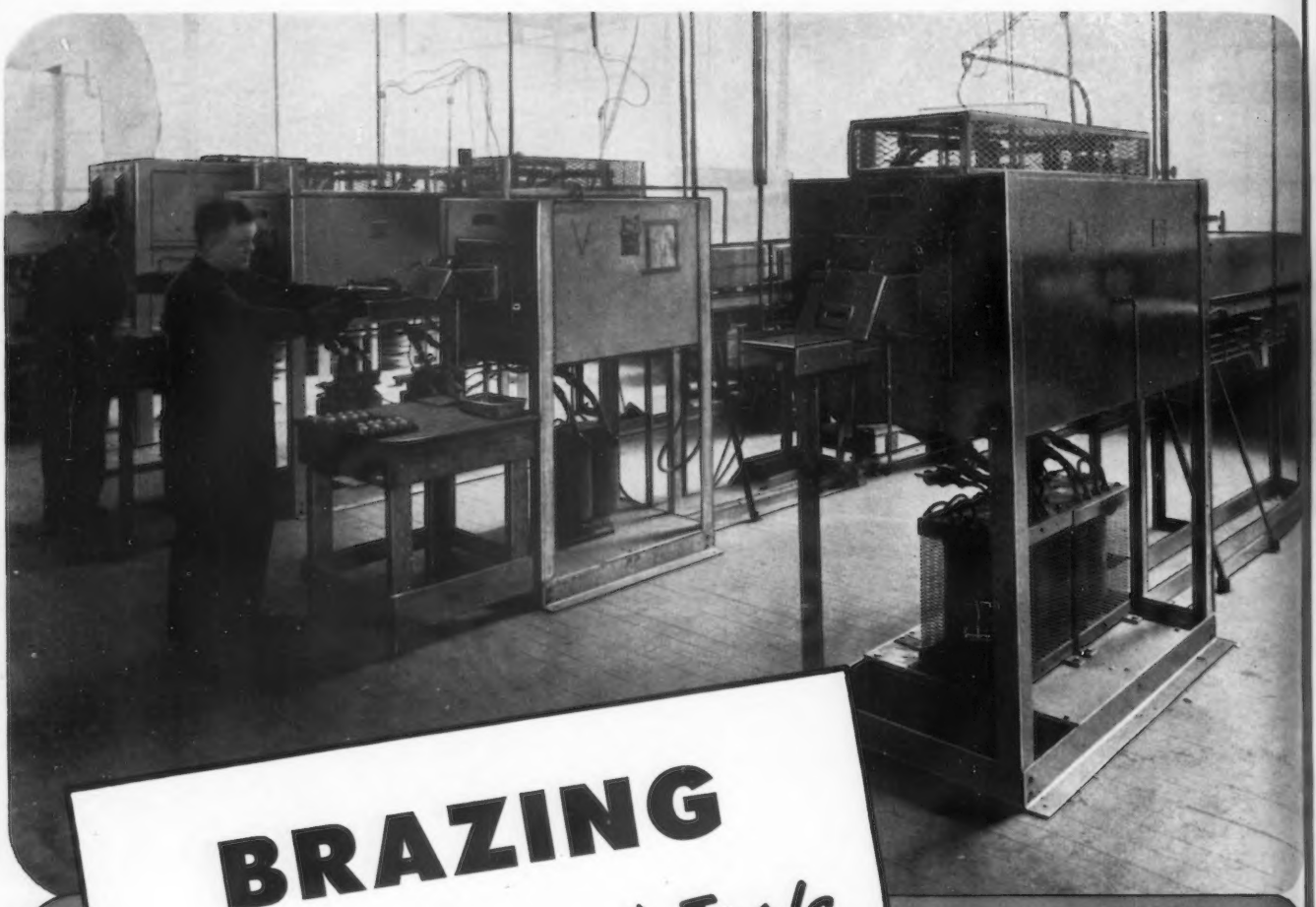
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Executive Offices
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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year. Single Copy, 35 cents. Annual Number, $2.

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Cable Address, "Ironage N. Y."

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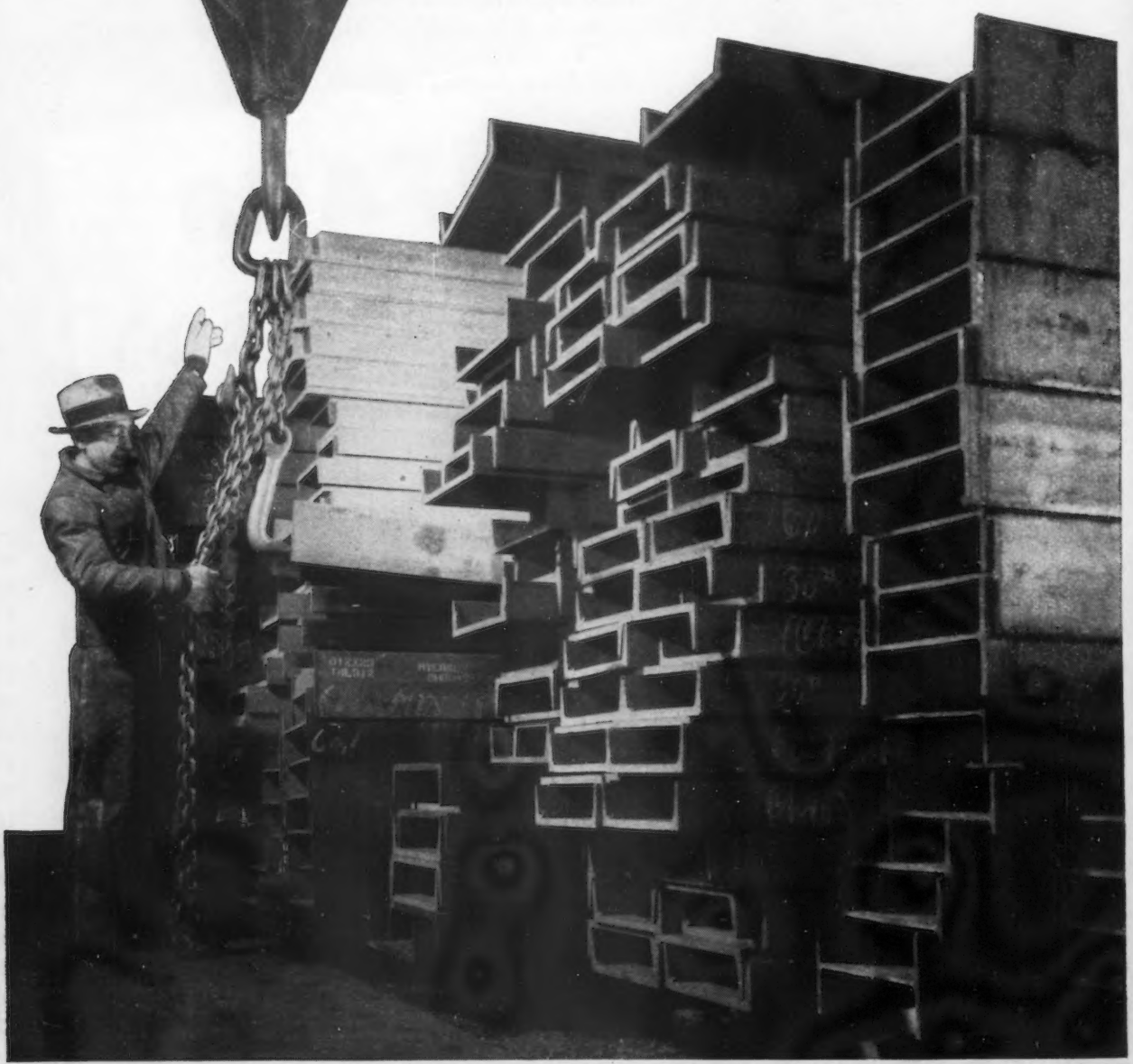
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Only A Bureaucrat Loves A Bureaucrat

WORDS come to have meanings in peoples' minds which may be quite different from their dictionary definitions. And the same word may convey very different connotations to various persons. Thus the word "law" means one thing to a thief and something quite different to a lawyer.

I have never known of anyone, however, outside of the bureaucratic circle itself, who had a kind word for bureaucracy. It is true that Harold Ickes said several good words for it during his recent speech before the Sales Executives' Club of New York, but I do not think that he made many converts.

To most of us who are on the receiving end, bureaucracy means something to be avoided as much as possible. It means the issuance of rules and regulations, particularly of don'ts. It means something similar to those "keep off the grass" signs in our public parks which are phrased without a "please" in front of them.

We have to put up with a certain amount of bureaucracy even in peace times because no one seems to have found a method of running a democracy without it. And in war time so many more rules and regulations are necessary that bureaus and boards and commissions, practically all of which are headed by appointees, have to be multiplied enormously.

The more bureaus, boards and commissions we have, the further we get away from democracy for the simple reason that our rules and regulations then, instead of being issued by elected representatives who are responsible to the public, are issued by appointees who are responsible to their appointer. Probably over 90 per cent of the rules which govern us today come from this source.

The danger in this is not the present size or state of bureaucracy, most of which may be necessary for war. It lies in the fact that we may get used to it and tolerate an unnecessary amount of it after the war. And that would be injurious to every class of Americans except one class, the bureaucrats.

Under the urge of war necessity, lines of authority which do not stem from the electorate are being established in almost every field of effort, lines which tend to reduce individualism to a minimum or to abolish it entirely. It is up to all of us to see to it that the public realizes the necessity of breaking these lines of super-government after the war or at least as many of them as are possible.

Labor, management and the American consumer have equal stakes in doing this and face equal dangers to their freedom if it is not done. The bureaucratic octopus is no respecter of persons and its tentacles reach and grasp blindly.

The well-being of business, of labor and of our consumers is dependent upon our seeing to it that the American environment after the war will be such as to permit the maximum exercise of individualism on the part of every one that is consistent with the rights of his fellow men.

J. H. VanDeventer



Three operators pierce, punch and trim at each press stroke.

Container Rim Output Increased 300%

Novel die set-up and Inland Sheets increase war part production

Output of cartridge storage container rims, drawn 4 in. deep on an 8-in. diameter, has been stepped up from 400 to 1200 per day. This increase results partly from die design and die use, and partly from the extremely low breakage of Inland Hot Rolled Pickled Sheets.

In the first operation 0.125″ stock is blanked and drawn full depth with ½″ shoulder, in a double acting press. These deep drawn parts are moved to another press in which are mounted two dies, one for piercing out the bottom and the other for sizing the bottom, which is used later to close the container. The two operations are performed at each press stroke.

The rim is then taken to a third press in which are three dies, which pierce locating holes, punch out the start of keyways, and trim on the 8-in. diameter. A rim is completed in three press strokes.

Final operations consist of spot welding three lugs to the inner surface of the rim, finish piercing the keyways, and swedging the lugs to the rim for a close fit.

The increased speed of manufacture of these cartridge storage container rims is an example of how Inland quality steel is helping America win the battle of production.



Inland sheets are blanked and drawn 4 in. deep in one operation.



Each stroke of this press pierces out the bottom of a rim and sizes the bottom obtained during the previous press stroke.

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The IRON AGE
AUG. 12, 1943

NEWS FRONT

• Fourth quarter essential steel requirements will be 4,500,000 tons greater than output, even though estimates put fourth quarter production 500,000 tons higher than third quarter. Carbon steels will be 4,000,000 tons short, alloy steels 500,000 tons.

• Northrop's long veiled but now accepted P-61 twin motored pursuit bomber with divided body and tail is now in production with first deliveries scheduled before Oct. 1.

• Bovingdon, the Dies-damned dancer, engaged by OEW for economic analysis of Far East, according to his application could speak and read Japanese, French, Russian, German and Spanish, reads Ceylonese, Javanese, Cantonese and Malay, was once $6000-a-year labor policy and personnel counsellor for American Woolen Co., Boston. He was danced out before OEW could evaluate him.

• Far from representing sanctions, the recent suspension of export licenses to Argentina was requested jointly by the U. S. representative in Argentina and the Argentinian government. Purpose was to check unsatisfactory consignees; most licenses were revalidated in a few days.

• And: the first step toward opening private import and export channels between U. S. and North Africa has been taken with lifting of the ban against commercial communications.

• The reason given for cancellation of wooden cargo plane contracts, sufficient aluminum production, is not the full story. Aluminum production isn't that good. One guess is that contracts were given in the first place only because of temporary pressure of public opinion.

• That wooden aircraft are makeshift is also implied in the same statement. The only operational wooden military craft is the British Mosquito; the Germans make their gliders out of tubular steel covered with fabric, and even their enormous new Me 323 (six motors) transport is of similar construction.

• Furthermore: In the U. S. one large plywood transport plane originally had some trouble and had to be additionally reinforced by steel with a sacrifice of some 1500 lb. in freight load.

• Now in production are several utility-gas-operated machines which will selectively harden large caliber steel cartridge cases at a clip of one every 10 seconds in a space 20 x 8 ft. Continuous speed units like this may very likely reshape traditional furnace concepts of heat treatment.

• Up to now the government has been discouraging post war planning by aircraft builders, but last week in Los Angeles, Pogue, CAB chairman, told manufacturers to resume research and development work as soon as possible on peacetime transport models.

• Between (most optimistically) Nov. 15 and (most pessimistically) Dec. 31, ship plates will be rolled at the $150,000,000 DPC Geneva mill in Utah, operated by Columbia Steel. The same company's 30,000-ton $6,000,000 steel foundry at Pittsburg, Cal., must be pouring within 30 days to maintain Navy and Maritime schedules on the West Coast.

• A process by which plastics, glass or any non-conductor may be plated has been developed by a Chicago company which claims that rounded surfaces, corners and recesses are as thoroughly covered as flat surfaces with non-chip, non-crack plating.

• For several weeks now the German newspapers and radio have gone all-out in a violent hate campaign in which foul language is the predominant characteristic. Profane and fierce invective is used so casually as to astonish an American listener, with Roosevelt, Churchill and the humblest citizen in Allied countries as the subjects.

• Big fundamental policy fight is shaping up on question of Federal industrial export subsidies. It will likely come to a head first with machine tools and steel.

• Axis typhus and food destruction rates will likely climb with the loss of North African red squill, a bulb derivative. Red squill, the world's best raticide, is thrown up by other animals, but rats can't regurgitate.

• Machine de-burring is rapidly replacing hand de-burring. For example: trigger guards are de-burred by wet grinding at the rate of 720 pieces in 1½ manhours compared with 720 pieces in 240 manhours by hand.

In-Line Machining of A

A MACHINED aircraft cylinder head comes off this 176-ft. transfer machine. This photograph was taken in the Greenlee shop. The machines are arranged in the form of an "L" in the Studebaker plant. The loading point, with a head being placed on the conveyor, is shown in the foreground.

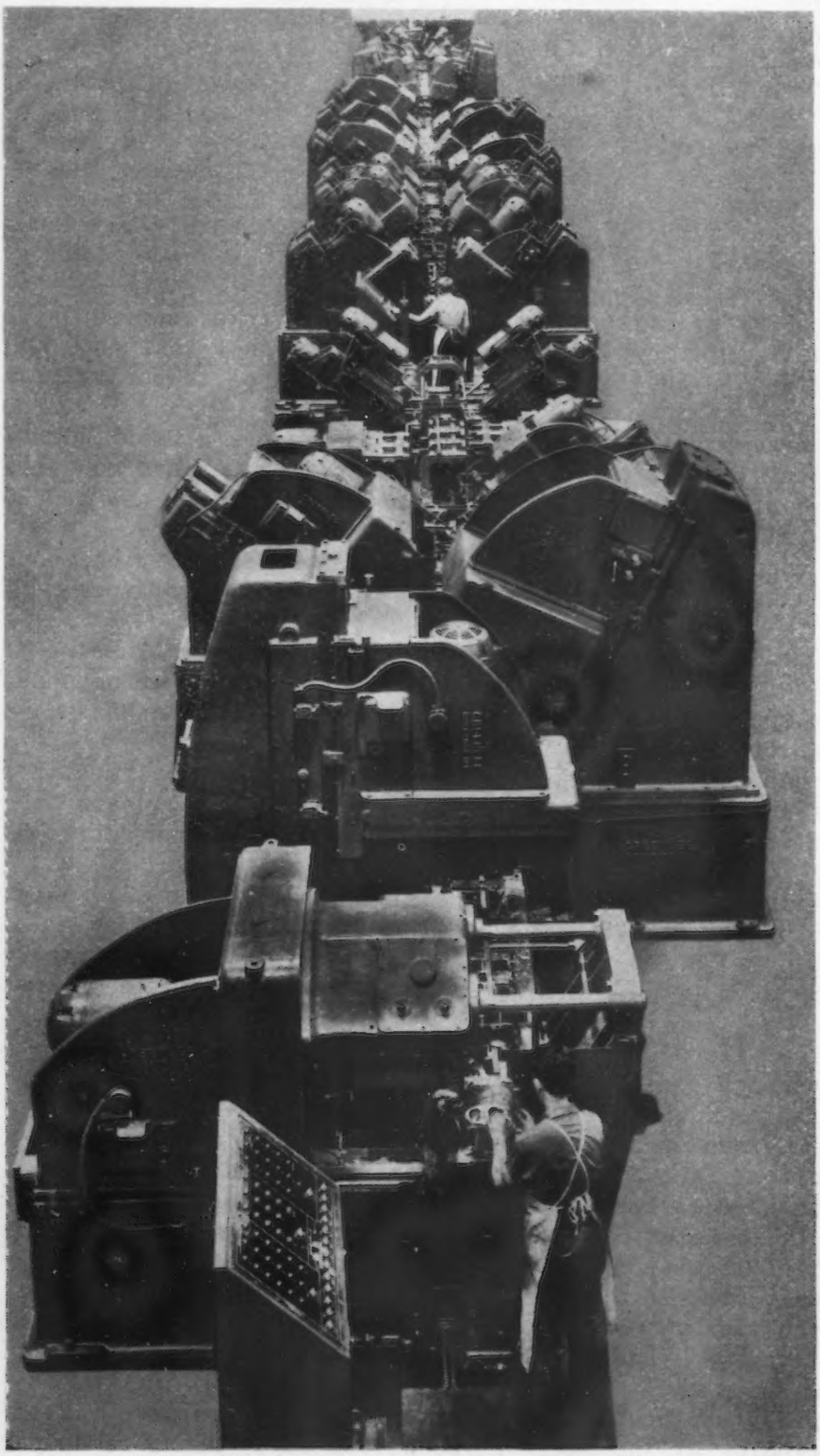
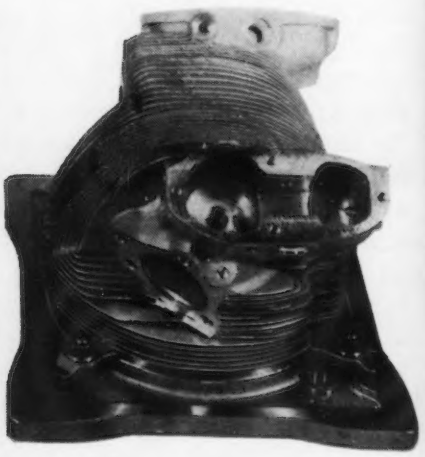
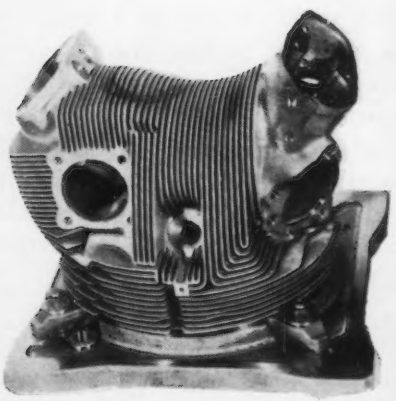


FIG. 1—Three views of a finished cylinder head on the carrier locating plate. Assuming the direction of movement through the machine to be toward the bottom of the page, the cylinder head is progressively turned as indicated here, being inverted before entering the third unit. Note the routing in the center section of the fins.







Aircraft Cylinder Heads

o o o

By W. A. PHAIR
Western Editor, THE IRON AGE

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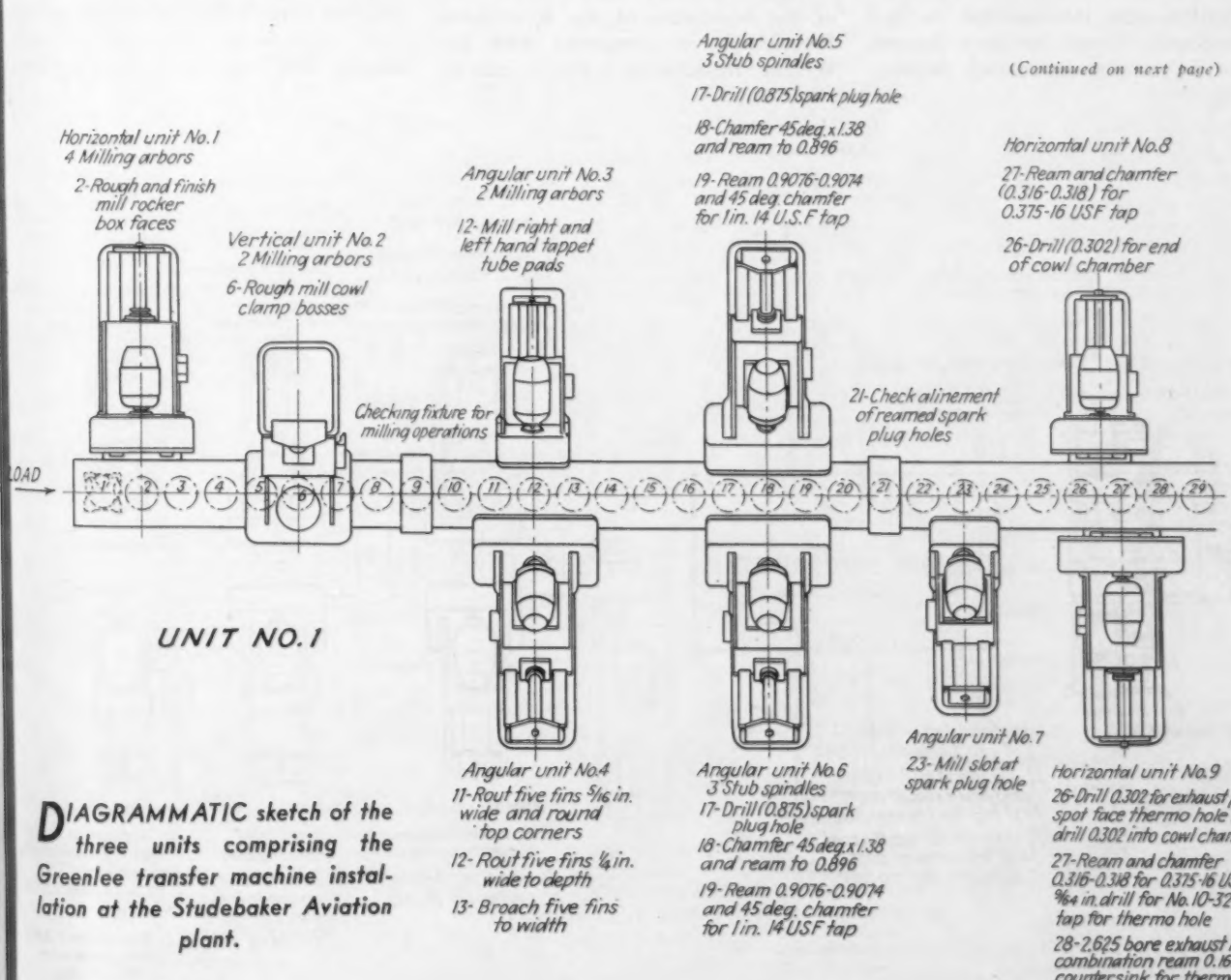
. . . The second single-purpose Greenlee transfer type machine installed in this country for in-line machining of aircraft cylinder heads is described in this report. This unit, built for Studebaker, has several features, including milling operations, not found in the first unit installed at a Wright Aeronautical plant, previously described in THE IRON AGE.

ONE of the most interesting aspects, from a tool engineering viewpoint, of the conversion of aircraft engine production from a job lot proposition to a mass production procedure has been the manner in which in-line transfer machines have been utilized by aircraft engine makers. This development was obviously not possible for economic reasons until war demand permitted large scale plane production. Naturally enough, in developing in-line machining processes, the aircraft industry made use of some of the production ideas developed in the automobile industry, and modified and improved these processes to fit the specific requirements of aircraft engine production.

The first installation of single purpose way machinery for processing cylinder heads on a large scale in the aircraft engine industry was in an Ohio plant of the Wright Aeronautical Corp. A second unit of this type has been in operation now for some months in an aviation engine plant of the Studebaker Corp. Both of these units were built by Greenlee Brothers & Co. of Rockford, Ill. Greenlee designed the tooling for the Studebaker job, as well as for the original Wright job. Both sets of tools were purchased from Gairing of Detroit.

A number of refinements, together

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DIAGRAMMATIC sketch of the three units comprising the Greenlee transfer machine installation at the Studebaker Aviation plant.

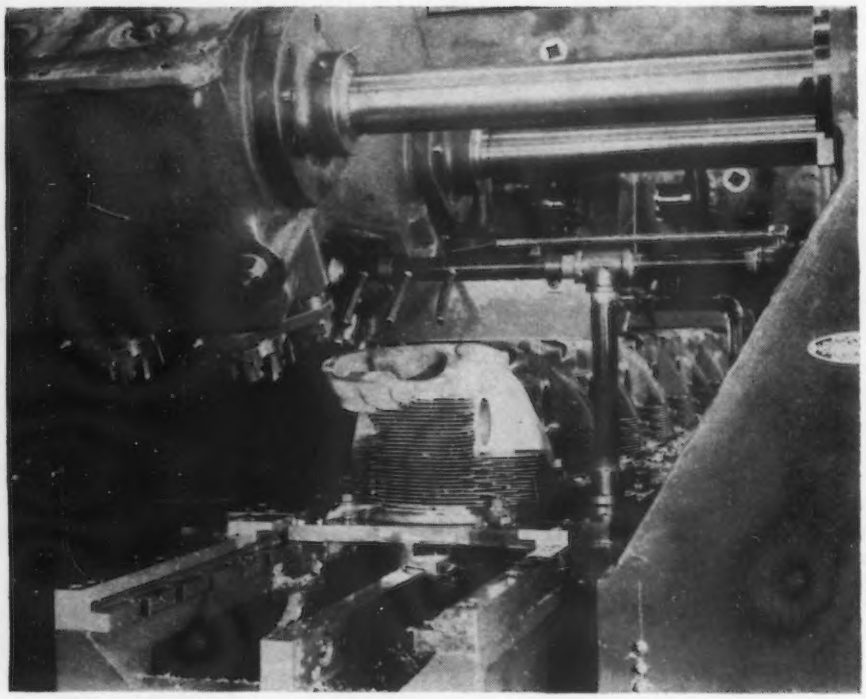


FIG. 2—Rough and finish milling of rocker arm boxes, the first machining operation in the Studebaker-Greenlee unit. The cutter head moves to the right across the cylinder head.

with several significant changes, based to a large extent upon experience maturing from the first Wright installation, are incorporated in this second unit. Credit for these changes must be evenly distributed between the engineering staffs of Wright, Studebaker and Greenlee.

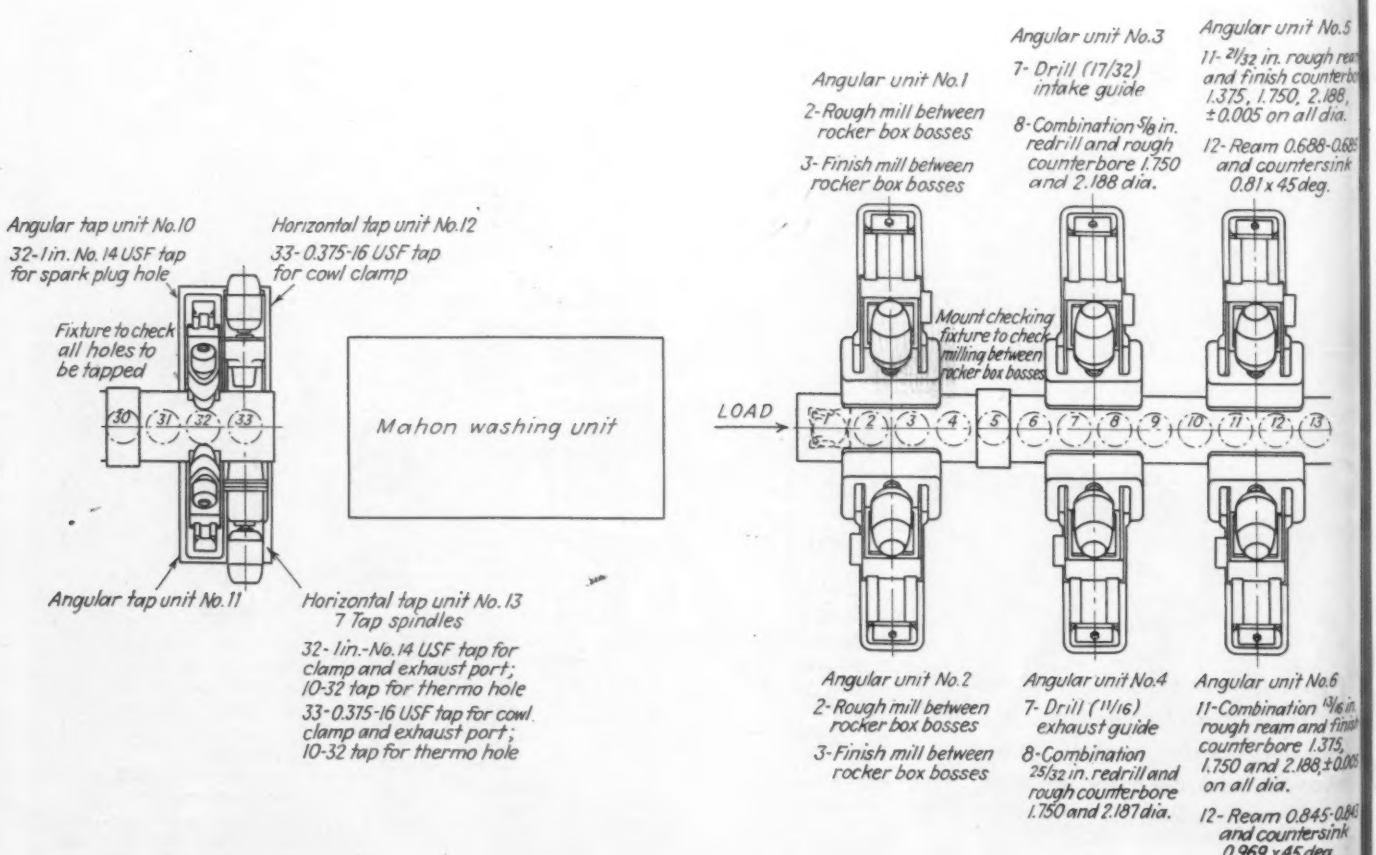
This article will touch upon some of the highlights of the Studebaker installation, as compared with the Wright installation. For a discussion of the philosophy and economic aspects of the use of these machines in the aircraft engine plants, the reader is referred to the very complete article on the Wright installation by H. E. Linsley of Wright, published in THE IRON AGE, Oct. 8, 1941.

When descriptions of the first Wright installation were made public the chief complaint from the doubting Thomases was that it wouldn't be possible to keep such a complex machine operating consistently. Breakdowns, they said, would make the machine a bottleneck. Apparently they overlooked the fact that the designers of the equipment had behind them many years of experience solving equally complex problems for the automobile, refrigerator, washing machine industry, et al.

Actual experience has substantiated the faith of Wright and Studebaker in such equipment, for these machines do deliver a high degree of utilization. In some instances, the matter of the supply of cylinder heads to feed the machine has been more of a problem than the functioning of the machine.

Three Units

The Studebaker installation consists of three units, all machines in each unit being electrically interlocked. The only mechanical connec-



tion between the various units is the conveying mechanism. The first unit is 44½ ft. long with 33 stations and 11 machines. The second unit, 101½ ft. long, has 79 stations and 27 machines. The third unit has a length of 30 ft. with 22 stations and four machines.

The stations marked "idle" in the accompanying tabulation of machining operations are not idle in the sense that they are unnecessary. For reasons of maintenance, inspection and tool changing and the shape and area covered by each individual machine, the machines must be set a certain distance apart. This distance is covered by "idle" positions of the transfer mechanism.

The cylinder heads enter the first unit with the long dimension of the rocker box housings moving at right angles to the direction of the line of flow of the heads through the unit. The head receives a 90 deg. turn before entering the second unit and then is manually inverted before entering the third unit to permit operations on the valve throats and guide holes. Fig. 1 shows these various positions. The mechanism for inverting the head is arranged so that the head is first elevated and then inverted. It is held in

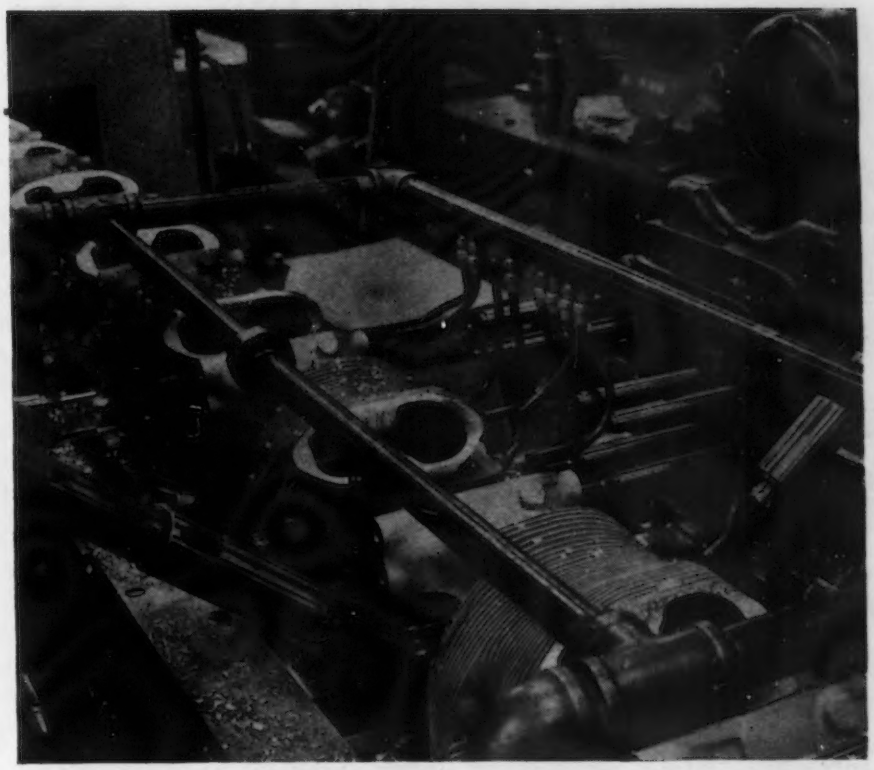


FIG. 3—Tapping spark plug holes, holding pitch diameter to a tolerance of 0.001 in.

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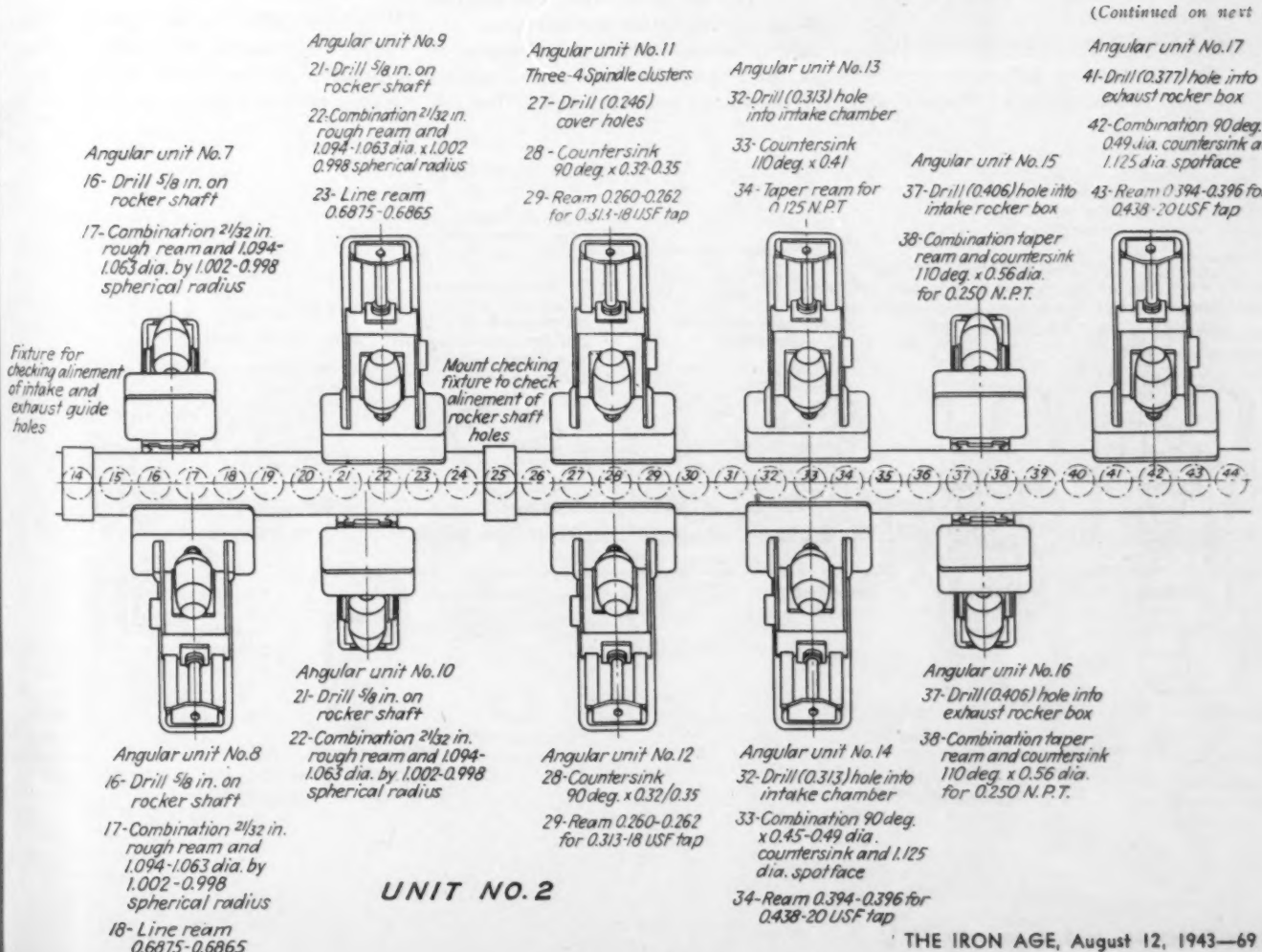




FIG. 4—Plunge milling operation on bottom of the rocker boxes. The front cutter takes the roughing cut, while the rear cutter does the finishing.

this inverted-elevated position for a short time to permit draining, and is then lowered onto the conveyor track.

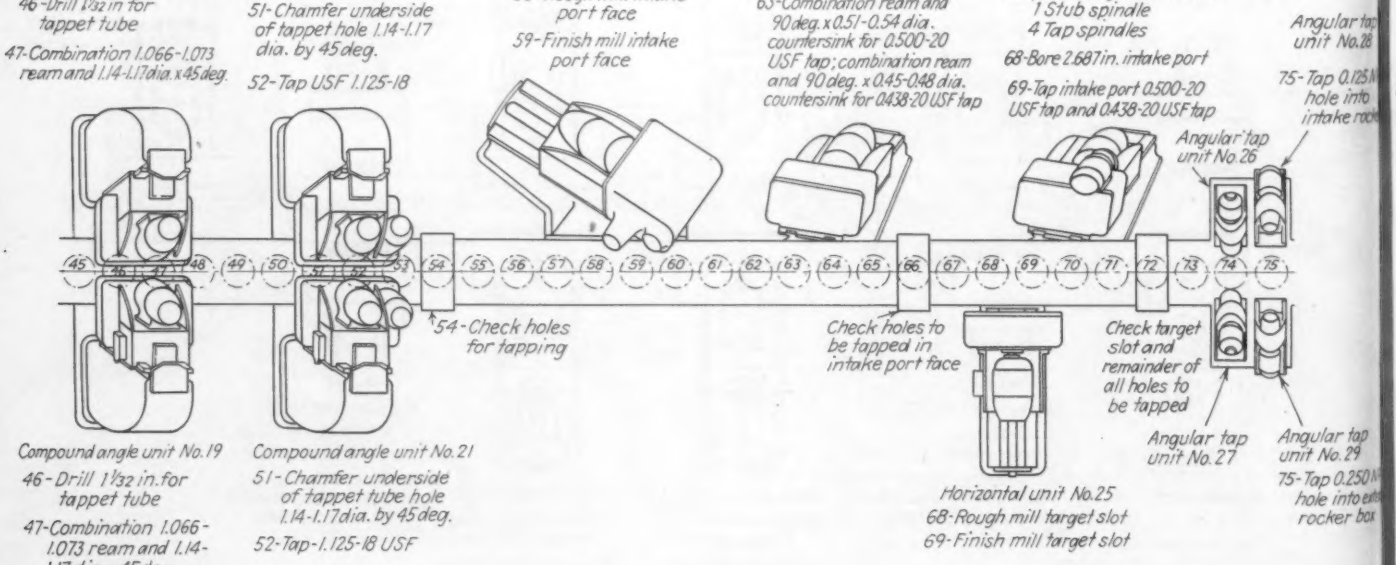
Milling Operations Included

The outstanding difference between the first installation at Wright and the second at Studebaker is that several milling operations are performed on the latter unit. The original Wright installation did not cover any milling work. The longest operation on the Studebaker unit is the milling of the rocker box housings. This job, the first operation on the machine, requires about 47 sec., including feeding, return and indexing. The actual milling requires about 32 sec. This operation, a new feature of the Studebaker unit, covers both rough and finish milling, as shown in Fig. 2. Both intake and exhaust housings are milled. In this photograph, the direction of the cutter feed is to the right, with the first cutter doing the roughing work and the cutter immediately following taking the finish cut. Both are cemented carbide cutters.

At stations 11 and 12 on the first unit an interesting routing job is performed with ball milling cutters. At the first station, oscillating high-speed spindles follow the contour of the outside edge of the rib. The diameter of the first cutter is greater than that of the second cutter which goes down to within ¼ in. of solid metal in the head and which travels parallel to the surface. Wooden wedges are inserted between the fins in this area before the head is loaded to avoid breakage of the fins during this routing and to prevent formation of burrs.

Fig. 3 shows stations 32 and 33 where spark plug holes are tapped. The tapping tolerance here is 0.001 on pitch diameter with a 1 in. pitch, Class 5 fit.

Another new feature of the Studebaker machine is the plunge milling operation on the bottom of the rocker boxes, as shown in Fig. 4. This opera-



tion is done on stations 2 and 3 of the second unit. This operation is performed by a Gairlock inserted blade tungsten carbide tipped channel milling cutter. Note that the head has been turned 90 deg. from the position in Figs. 2 and 3.

Fig. 5 shows operations performed at stations 51 and 52 in the second unit, back chamfering and tapping of push rod tube holes. This view, taken from station 59 looking toward station 52, also shows a gage for checking the depth of holes to be tapped. A shaft from the checking unit leading to a limit switch can be seen immediately beneath the conveying mechanism. This limit switch prevents advancing the line while gages are still in the work. Note also the limit switches mounted on the machine column to the left.

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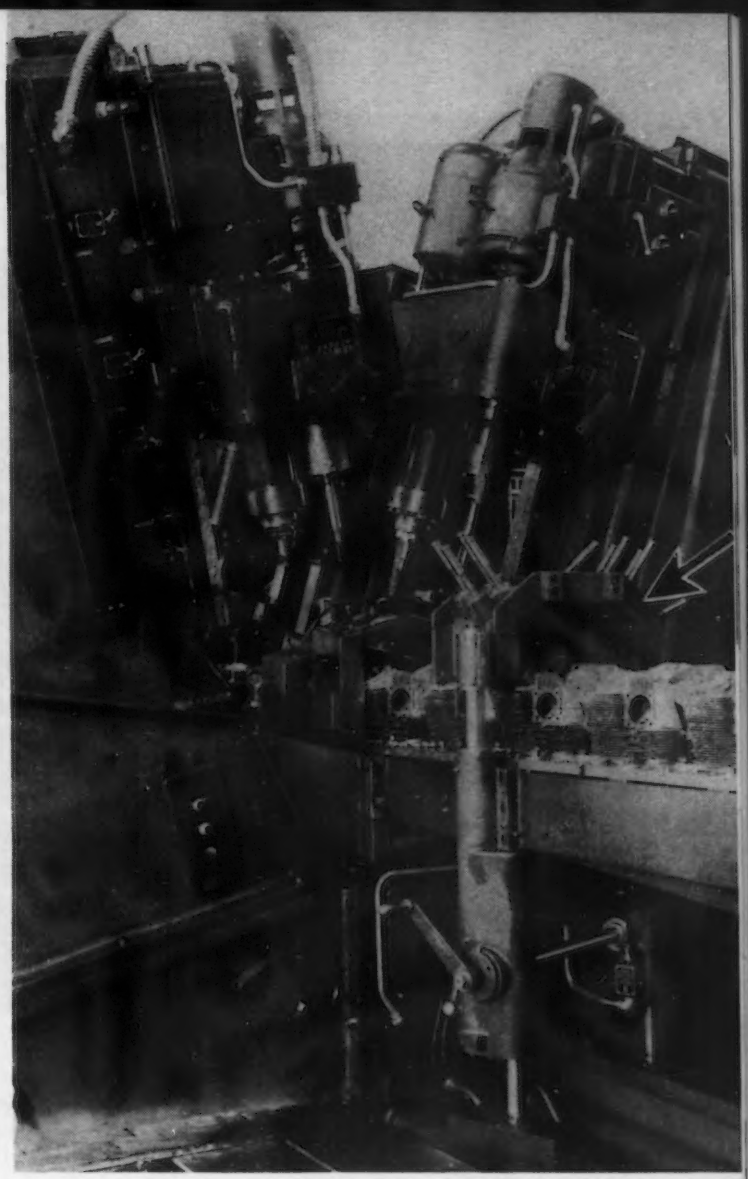


FIG. 5—Back chamfering and tapping push rod tube holes. Note the gaging fixture (arrow) in the foreground which is interlocked with the mechanical transfer system.

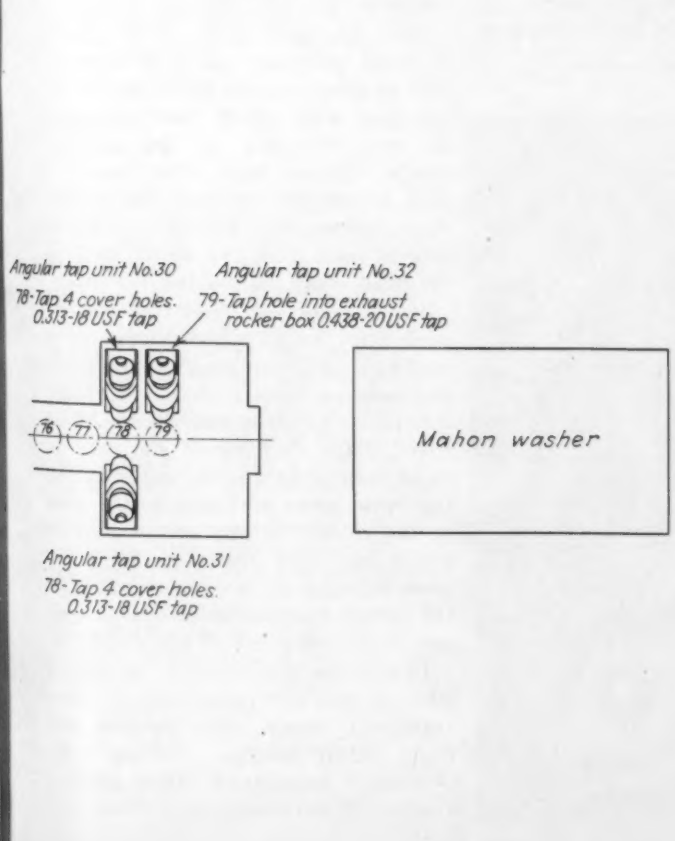
Stub Boring

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Fig. 6 shows stations 68 and 69 where the intake port is bored and tapped. Fig. 7 is an interesting close-up of a stub (non-piloted) boring operation on the third unit. Greenlee engineers are exponents of stub boring and have used it extensively in these units with success. This operation covers stations 10 and 11 on the third unit. Note that the head has been inverted for this operation.

The Mahon washers installed between the first and second units, the second and third units and at the end of the line were originally developed

(Continued on next page)



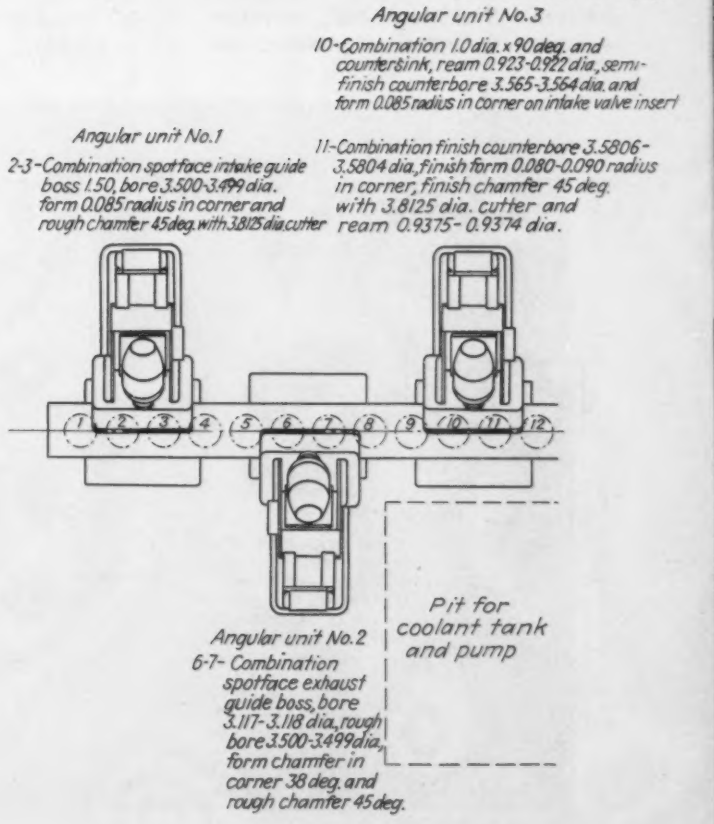




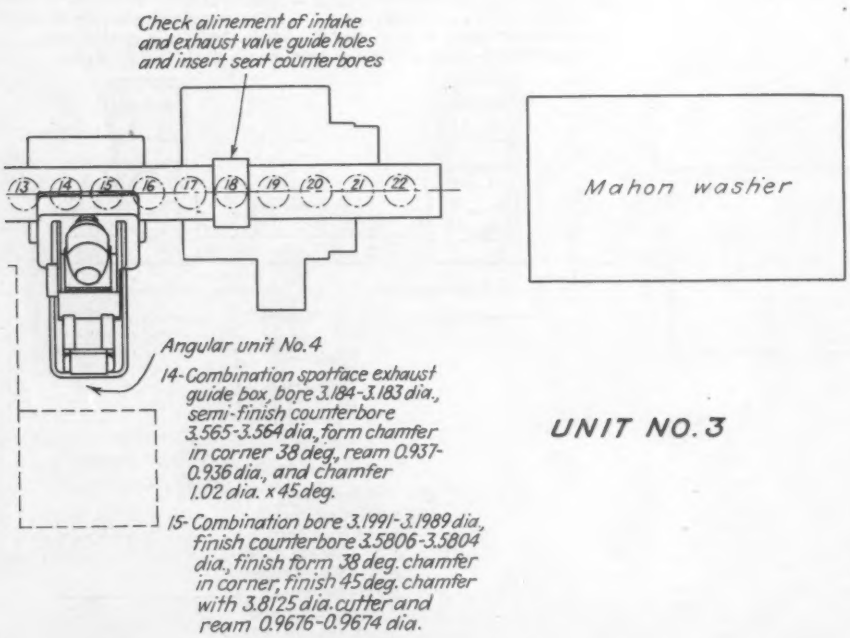
FIG. 6 — Angular boring and tapping of intake port, one of the few operations where spindle support bushings are used.

to use Varsol. However, it was found that it was not possible to separate the Varsol and the cutting oils. Hence the washing machines are now operating on the No. 5 cutting oil (See below) and no separation problem is involved. This "washing" operation is largely a matter of flooding out chips from the holes and cleaning off the plates.

Cutting oils used by Studebaker are as follows:

No. 5—Mineral seal oil—20 parts
Sinclair Union base—1 part

No. 5A—Safco No. 560 (Swan & Finch)



UNIT NO. 3

The first unit uses the No. 5A mixture which seems to give the better cooling needed for the large number of tapping operations performed there. The other two units use the No. 5 mixture.

The chip and oil handing system in these machines also is of interest. The coolant pipes to the work are all equipped with cut-off valves operated by the movement of the machine heads. Thus, when the head is progressing into the work the coolant flows, but as soon as the actual cutting is completed, the withdrawal of the head shuts the coolant flow off.

Beneath the machines is a gravity feed chip trough which slopes to a settling tank equipped with baffles and screens. After passing through this tank, the oil is recirculated. The effect of the shutting off and turning on of the valves during each machining cycle gives a surge in the flow of the coolant in the troughs. This surge has been found to be much more effective in moving chips down the trough than a steady flow of coolant.

In addition to the regular inspection stations, this new installation also has stations to check holes, location and depth before tapping. Milling work is checked immediately after the operation. These inspection stations are

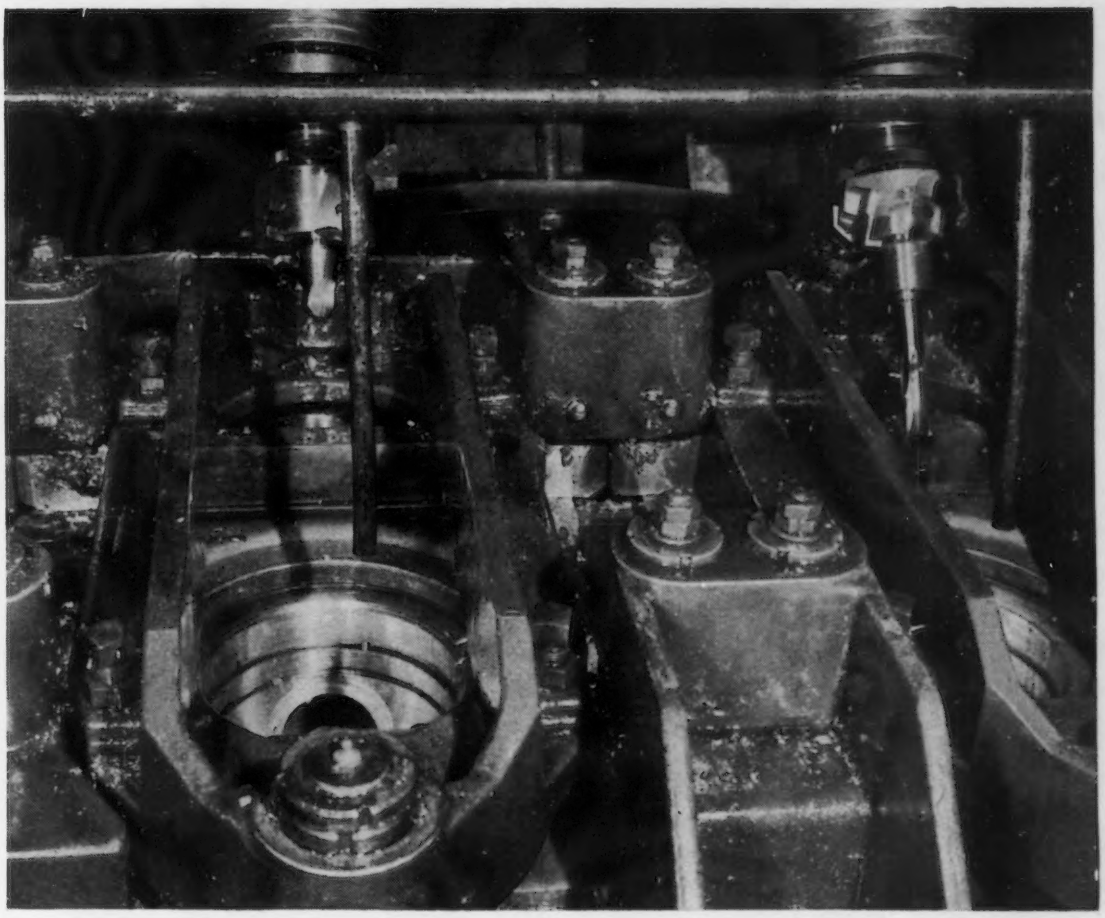
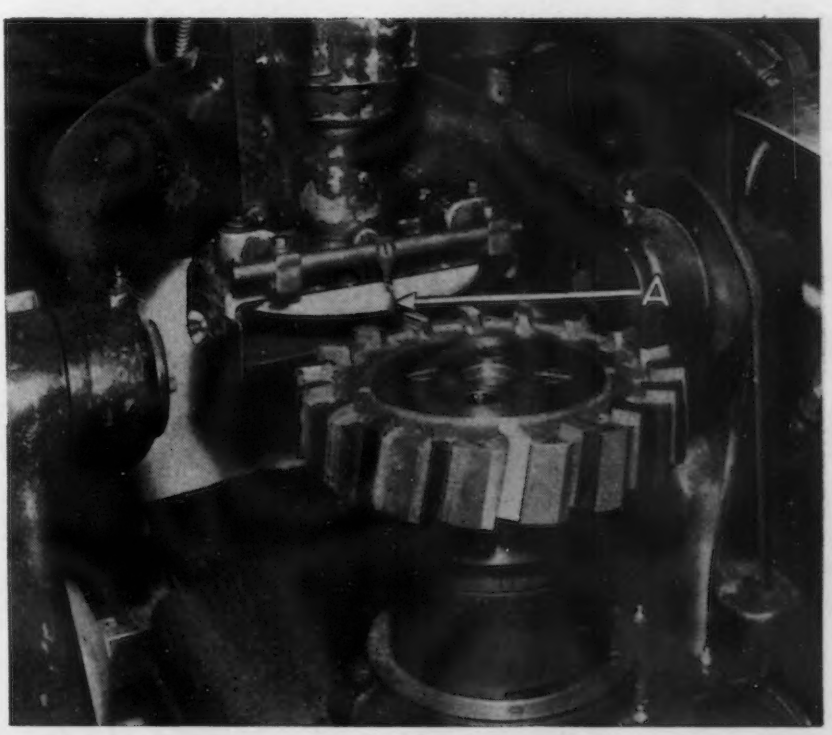


FIG. 7 — Stub boring and reaming valve insert seat and guide holes in the third unit in which the head is inverted to process the valve throats and guide holes.

interlocked with the machine, as shown in Fig. 5.

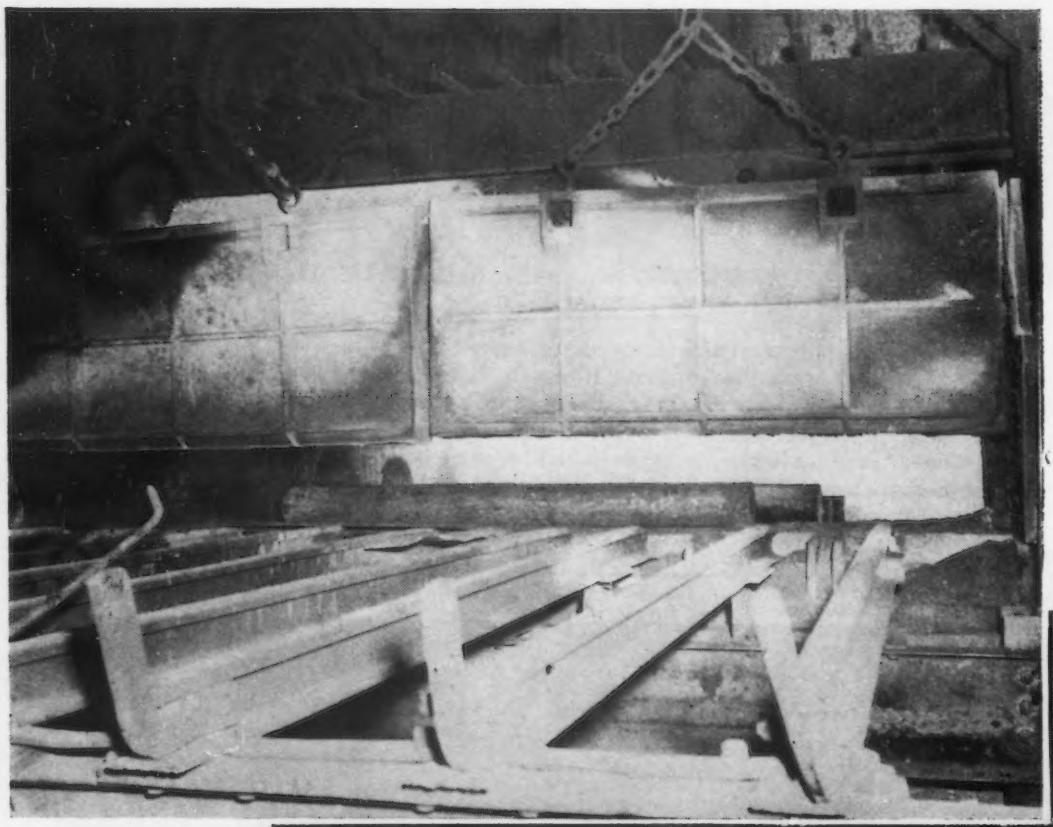
The tool changing operations on such units cannot be covered by a specific policy due to the variances in the tolerances which must be held for individual holes and also the fact that certain operations cause higher tool wear than others. However, experience has indicated when a certain type tool may be expected to wear out and an effort is made to anticipate this by making a change during the shift changeover The contrast in tool life is unusual. For example, the drills on the valve guide holes have to be changed every 4 hr., while the original carbide insert milling cutter on the push rod pads was still in service after some 20,000 hr., and still has appreciable life left.

A SIMPLE idea that improved the consistency of accuracy with which milling cutters can be sharpened is shown in the accompanying illustration of an Ingersoll machine. The grinding machine is provided with a carboloy-tipped finger "A" that follows the contour of the tooth and guides the grinding wheel. Guide fingers made of alloy steel, it has been found, wore away very rapidly, making frequent adjustments or replacement necessary. To correct this condition, a cemented carbide tip was brazed to the finger after milling a recess. The hardness of the carbide vastly increased the life of the finger.



Heavy Gun Tubes from Seamless

. . . A new way of making heavy gun barrels from seamless steel tubing, at enormous savings in time and materials, has brought Timken Roller Bearing Co.'s monthly output of heavy guns to a higher level than all of England's heavy gun output during the entire war. Formerly such gun tubes were forged. The pictures on this and the following pages illustrate Timken's new seamless tube method.



LEFT

FIG. 1—Big bars of steel rolling into the piercing mill furnace are on their way to becoming the shooting end of 75-mm. guns. Gravity gradually draws them, red hot, to bottom of furnace.



RIGHT

FIG. 2 — Giving gravity a hand. Heated bars are kept steadily rolling down slope to furnace hearth.

Tubing



RIGHT

FIG. 3—Ram forces 1400-lb., 84-in. bar from a side door at lower end of furnace. Gravity conveyor carries it to piercing mill.



LEFT

FIG. 4 — More than 5 hr. of production time are saved in boring the gun tube. Piercing takes 15 seconds. Former forging and drilling method required 6 hr. for this one operation.



RIGHT

FIG. 5—Rolling mill, into and out of which newly-pierced gun tube is raced. Inner walls are further smoothed, and tube is rerolled to greater accuracy.

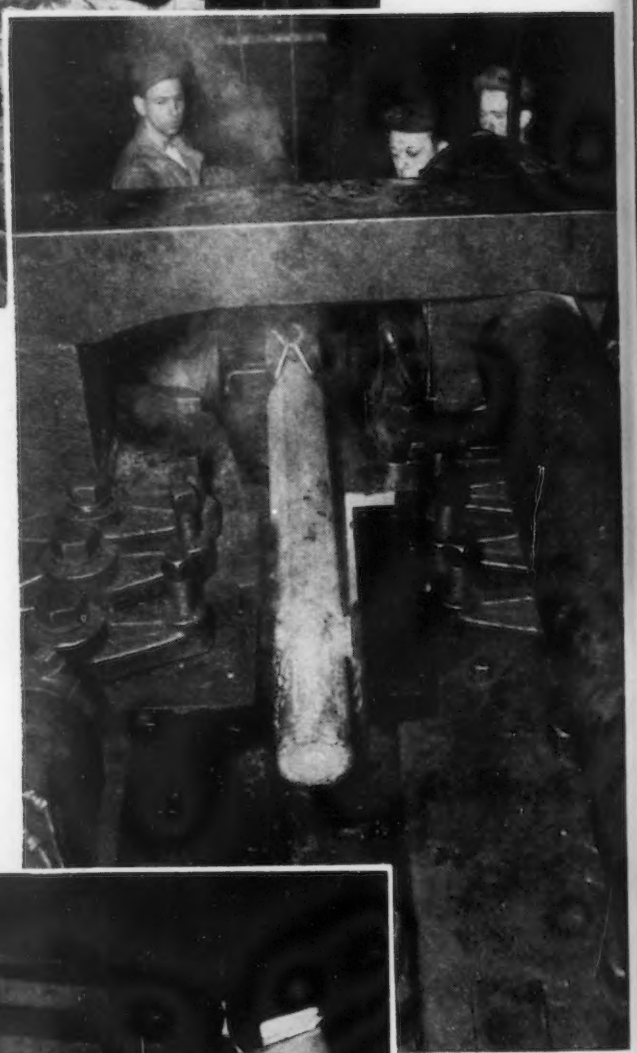


ABOVE

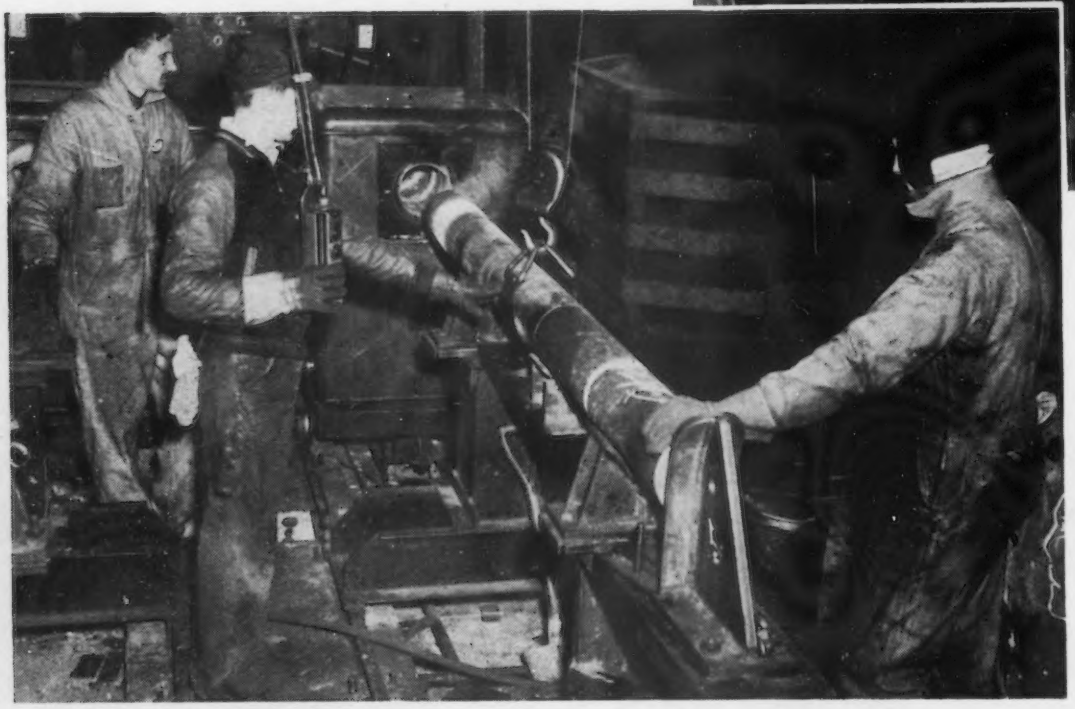
FIG. 6—Racked and ready for finishing. Tubes at right have already had rough ends removed. To save steel, tubing is made to diameter of gun tube, not to diameter of breech, as before.

BELOW

FIG. 8 — Red hot end is shoved into forging machine.

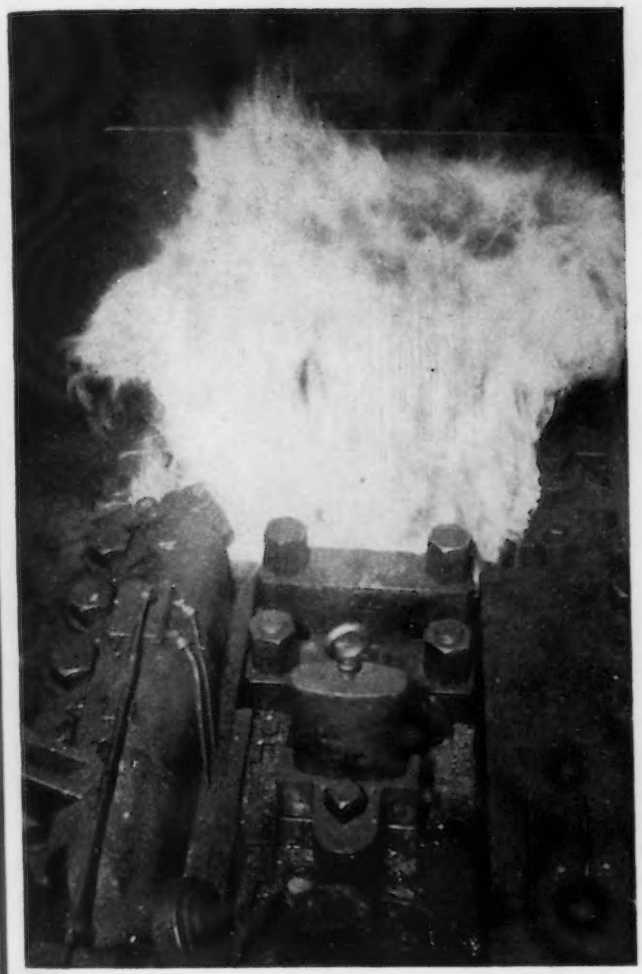


Heavy Gun Tubes from Seamless Tubing



LEFT

FIG. 7 — Electric induction furnace heats breech end before upsetting to form breech.





ABOVE

FIG. 10 — Half-opened forging die reveals freshly formed breech. Upsetting to size from gun tube-sized tubing rather than machining, casting, or forging breech from bar of breech diameter requires considerably less time, reduces scrap, saves strained melting facilities, too.

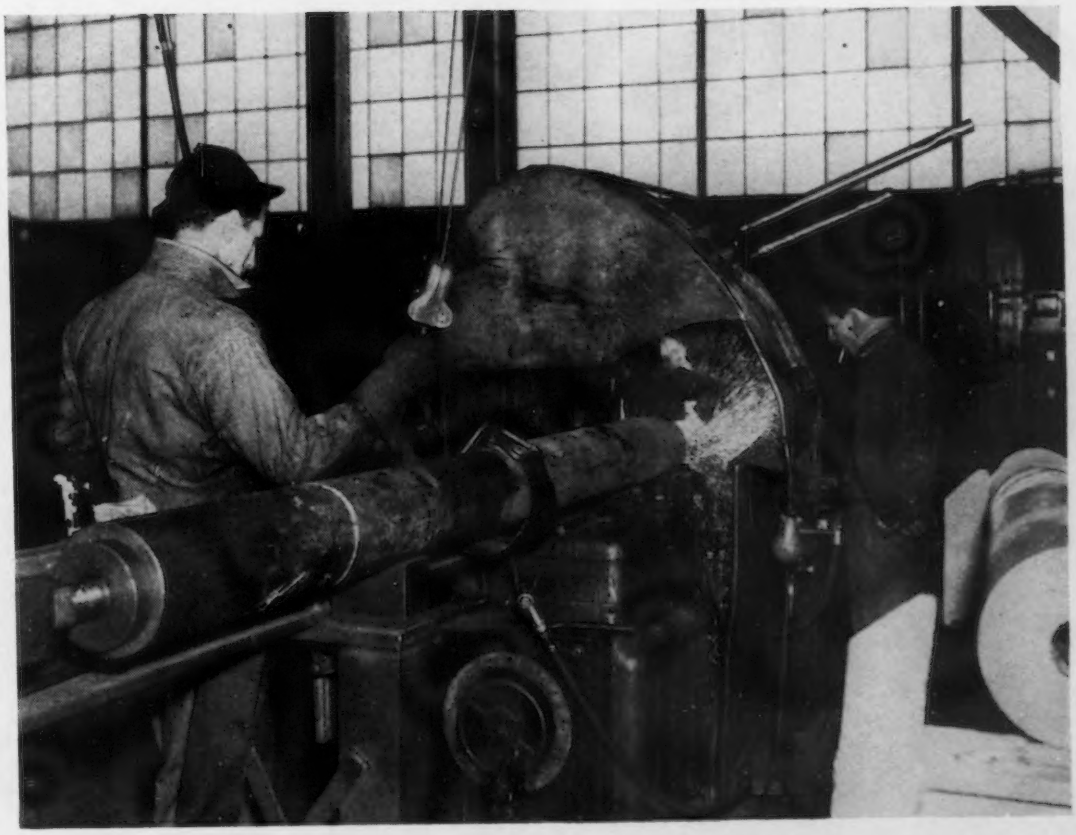
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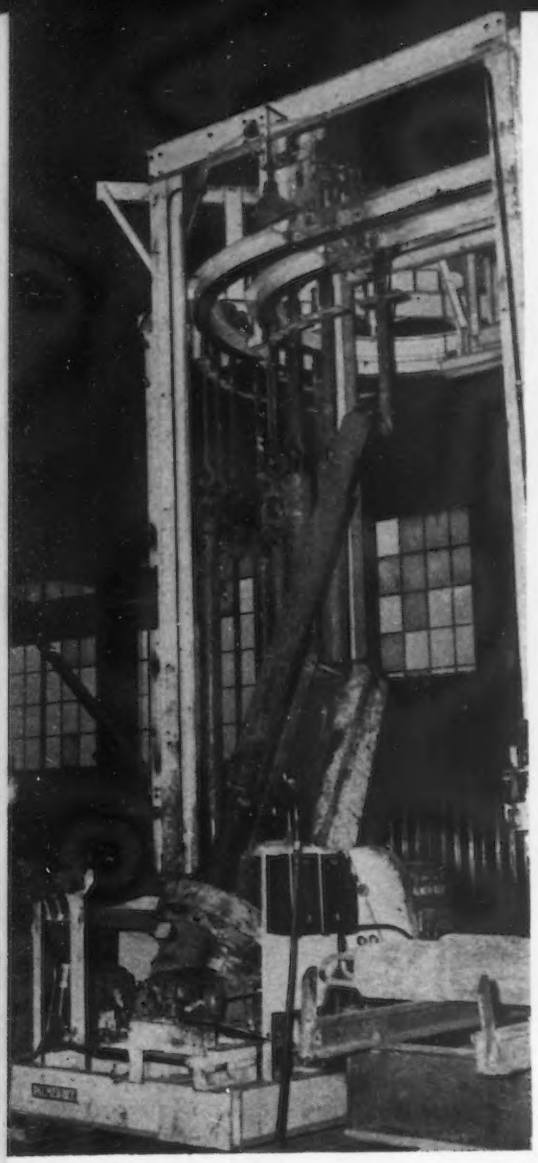
FIG. 9 — Under this sheet of flame, gun breech has been formed in 5 sec., using ordinary upsetting machine.

o o o

RIGHT

FIG. 11—Welding "handling bail" to breech end so tubes may be carried vertically through normalizing, hardening, and tempering furnaces.





o o o

LEFT

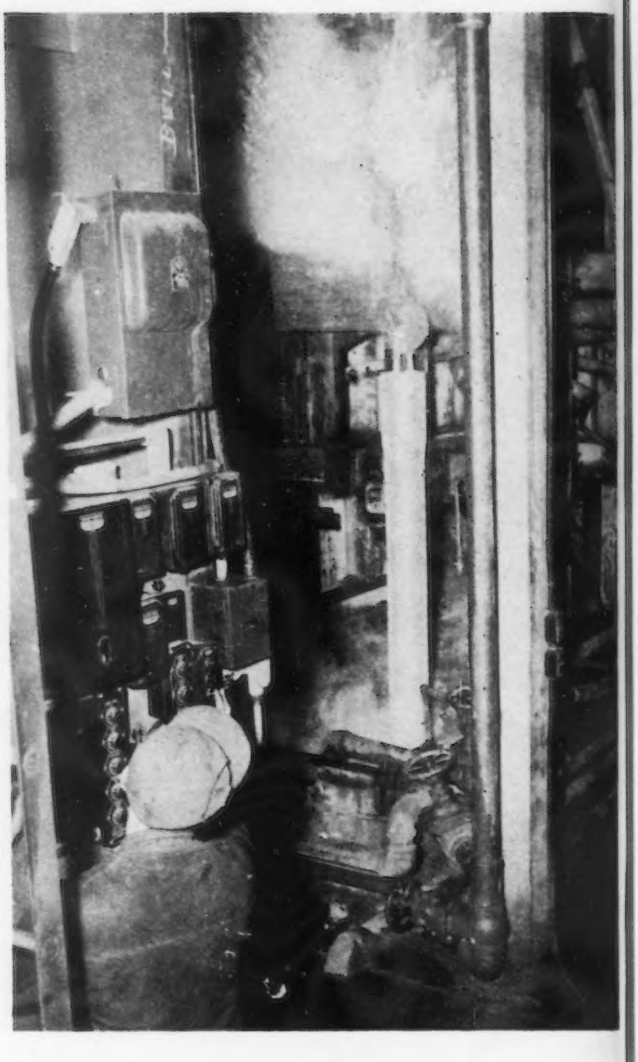
FIG. 12 — Device lifts tube to conveyor system moving steadily through heat treating furnaces. One production line is capable of producing 6000 75-mm. gun tubes a month.

o o o

RIGHT

FIG. 13—A 75 mm. gun tube fires its first shot—out the breech end. As the red hot tube emerged from a heat treating furnace and was being lowered into water quench, steam built up inside and blew water out top.

o o o



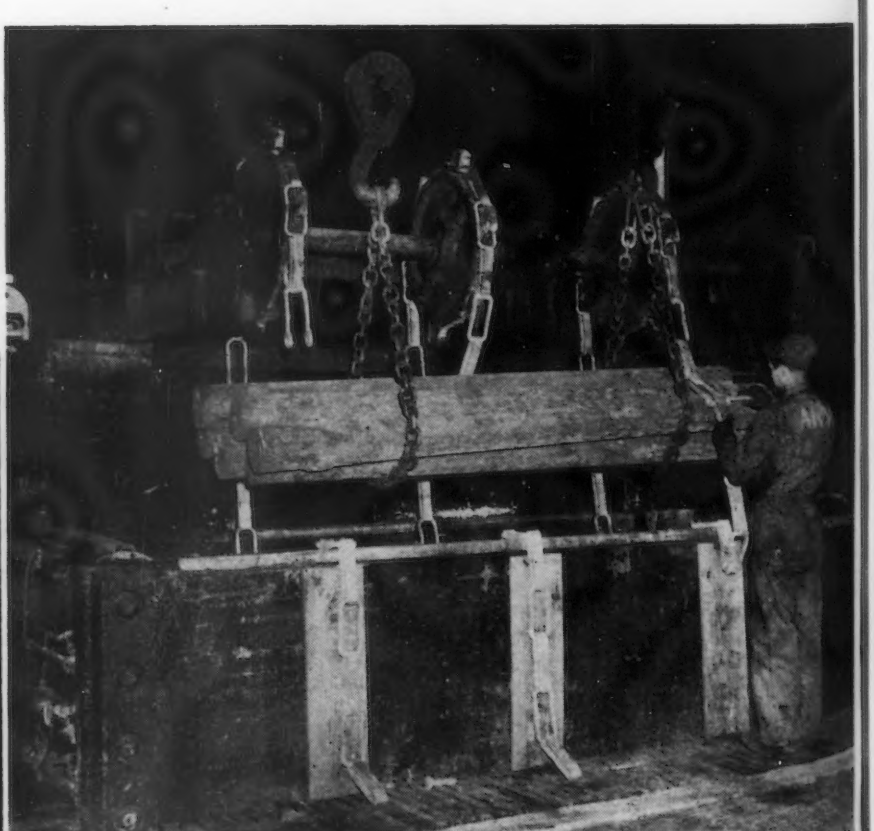
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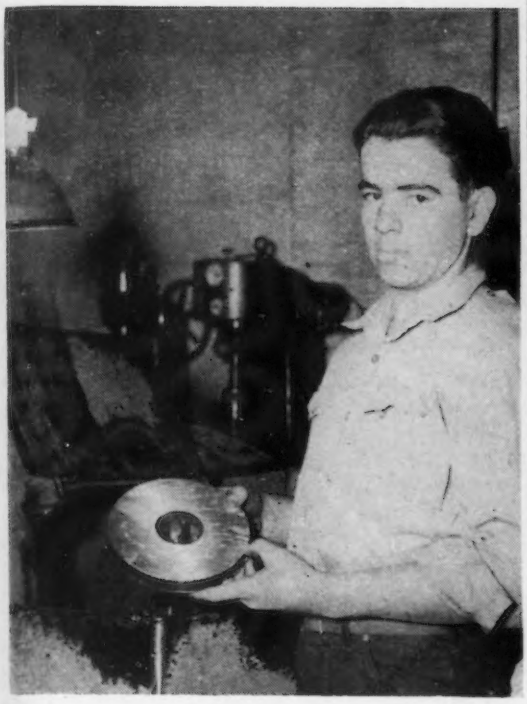
FIG. 15—Tubes are tumbled into pickling vat to wash away heat scale.

BELOW

FIG. 14 — Stamping code numbers. Each tube is numbered to indicate when its steel was made, by whom, the analysis, whether it came from top, center, or bottom of ingot, etc.



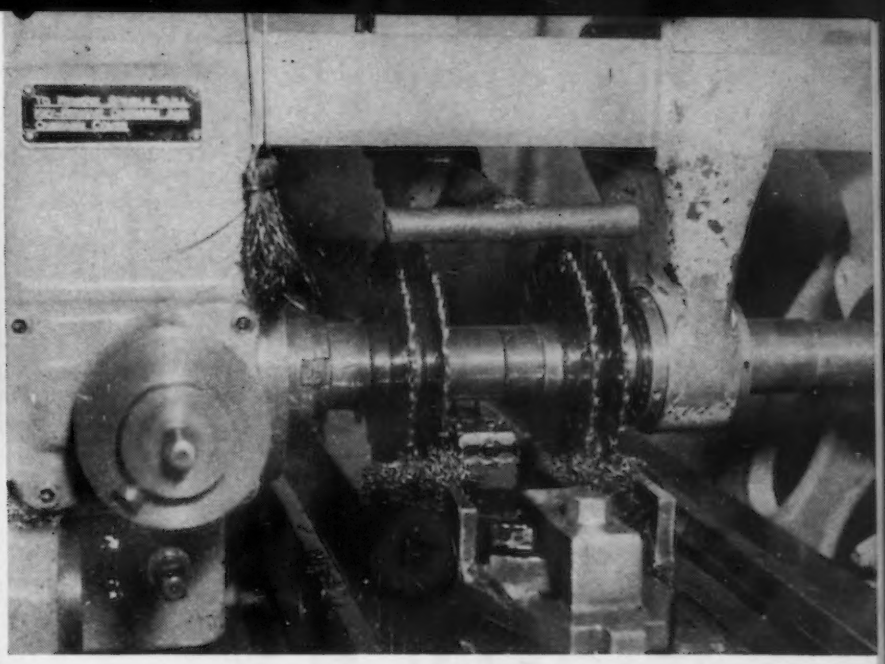




ABOVE

FIG. 16—Ring of steel sawed from tube goes into testing laboratory for macro-etch inspection.

o o o



ABOVE

FIG. 17—Two small squares are sawed from ring to be machined into physical test specimens for determination of yield strength, ductility, etc. Gun tubes made of seamless steel tubing have less chance of failing.

o o o

BELOW

FIG. 19—75-mm. gun tubes at exit end of continuous heat treating conveyor line, novel time-saving feature of Timken-developed process. Tubes are shipped to government arsenal for finishing.



BELOW

FIG. 18—Army makes final check-up. Here inspector uses a tell-tale gage to determine concentricity of inside diameter. If laboratory approves sample, the gun tube is loaded into freight car.



Plastics and Plasticity—III

By E. V. CRANE

Chief, Development Engineering Department, E. W. Bliss Co., Brooklyn

Temperature, pressure and time are the three elements involved in forming any of the engineering materials, be they metals or nonmetals. Before developing some of the plastic methods of working them, Mr. Crane in the third part of the article discusses casting methods since injection molding of plastics is a form of die casting. Compression molding began with the ceramics and the same principles apply to molding powdered metals, the author points out. In the fourth part, forming of synthetic resins is analyzed.

THE list of materials, both simple and complex, which are presently passing through their chemical and physical adolescence into utilizable engineering materials reduces those which were familiar at the turn of the century to a numerical insignificance at least. The most complex are nature's recipes—wood, stone and clay—which have been whittled, pounded or molded to useful shape by rule of thumb methods through the ages. The newest are the synthetic alloys and mixtures which by the substitution of orderly science for art, have been made available and tractable for the greater good of the greater number. As the fog of experimental manufacture lifts from each usable arrival, it is found to be formable by the orderly application of nature's own routine, i. e., temperature, pressure and time. Hence, it seems worthwhile to note what may be involved in varied combinations of *form* with *temperature*, *pressure* and *time*.

Form implies some combination of usage, art and purpose. For manufacturing purposes the form must be translated to suitable engineering dimensions, and thence to "tools" (molds, dies or rolls) suitable for reproduction of the form or part in the selected material. As compared with common knowledge of casting, primarily in molds made of sand and clay, and of forming primarily in dies and rolls made of hardened steels, there is now available a diverse choice and usage of tool materials ranging from confined steam, water and rubber to plastics, plasters, wood as well as cast, rolled and powdered metals, including sintered carbides reinforced with prestressed alloy steels. Governed always by comparison of costs of tool material and tool fabrication with useful tool life, the material must be capable of standing the temperatures and pressures involved. Furthermore, it should be of a sufficiently dissimilar nature to the material being formed to avoid galling (pressure-welding or inter-molecular cohesion).

Temperature Ranges

Temperature required in manufacturing processes may vary from subzero, as in forming cakes of carbon dioxide ice, to that of the electric arc, as in producing synthetic abrasives. Temperature must often be controlled within rather narrow limits for success. Several general temperature ranges should be recognized, as follows:

Crystalline range, in which the material is frozen or set in its crystal pattern, although that arrangement may be disturbed by pressure working if the pattern is sufficiently simple to allow crystoplastic forming

Recrystallization range in which electron activity becomes sufficient for atomic or molecular readjustment, as in stress relieving and annealing

Thermoplastic range from recrystallization to fluidity, in which a thermoplastic material may be moved about more freely as temperature rises, within purely mechanical limits of movement

Fluid range, as for casting purposes, in which interatomic or intermolecular bonds are rendered transient by heat or solvent

Gaseous range in which atoms and molecules space themselves quite independently (This also enters in soluplastic and solusetting processes where a liquid solvent must be evaporated or "dried out")

Heat treating range in which dispersion hardening or suitable crystal grain size is established, and

Thermosetting range of certain mixtures in which chemical change of adhesive constituents takes place at prescribed temperature. In most if not all of these the temperature range limits are subject to varia-

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[15] A. J. Langhammer, Milton F. Smith, Amplex Division, Chrysler Corp., in Powder Metallurgy, A.S.M., 1942.

[16] See Fig. 183a, p. 213 and Fig. 291, p. 306, Plastic Working of Metals, by E. V. Crane, 2nd edition, John Wiley & Sons, Inc.

tion with internal stresses or external pressures.

In that the commercial aspect of relative expense governs the success of competitive enterprise, investment and operating charges receive primary consideration at every step. Heating equipment cost, fuel charges, hot handling charges, temperature control, cooling costs, atmosphere control, cleaning, washing and drying costs are frequently substantial items whether process temperatures are high or low.

Pressure Factor

Pressures may vary from a near vacuum, used in distributing from solution, as in paper making and screen molding, to a hundred or more tons per square inch in severe extrusion and cold forging operations. Increasing flow speeds, greater restrictions to flow, more viscous or tougher materials, more severe restrictions on cavitation and entrained gas flaws, and closer tolerances on finished parts require ever more powerful and more rigid machinery to cope with conditions.

Time Factor

Time is the fourth ingredient in manufacturing recipes and "the fourth dimension" on the process chart. Sufficient time must be expended to complete precisely the feeding, heating, stress relieving, chemical reaction, drying, discharging or whatever the step may be. In every case, time is distinctly money. The synthetic plastics, for example, have been definitely handicapped competitively in their initial development by the time required (in expensive equipment), to complete the transmission of heat and the chemical change to set, or the relief of intermolecular strains. The reduction of time per unit through larger quantities in process and more efficient processing equipment is the essence of American mass production.

Casting Process

Plastic working, first of metals and now of many more materials, seems properly limited to the several plastic states (see preceding article). Indulgence is requested, however, for some consideration of the fluid state involving casting.

Casting or the pouring of a fluid material into a suitable mold to harden or set is simple but may readily be quite troublesome. Tendencies are common to shrink, to entrap air bubbles, to produce gas bubbles or shrinkage voids, to crystallize or set non-uniformly with internal strains, to erode the mold and pick up dirt or impurities, and to segregate in the case of mixtures, giving non-uniform chemical and physical properties.

Solvents, such as water, oils, alcohols, esters, etc., render many materials and mixtures fluid for casting. All require considerable time and possibly heat for drying and the more expensive solvents must be recovered for economy. Concrete is poured in earth, wood and metal molds. Magnesite building materials may also be poured in laminated plastic molds with rubber cores for easier stripping. Wood pulp, wood flour or other organic fibers with suitable binders may be cast in screen molds with the aid of air pressure or suction as in papier-mache and similar work or progressively on screen belts or rolls as in starting paper, belt and synthetic board manufacture.

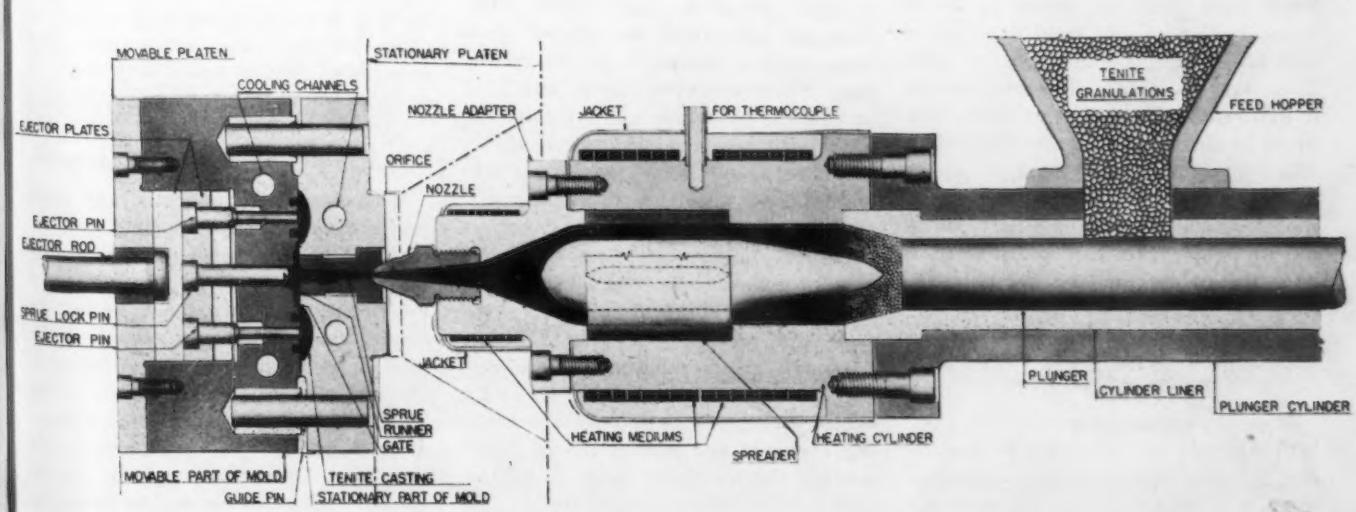
Heat is expended to melt to fluidity many materials extending from the waxes and resins to the glasses and steels, each in its turn representing a wide variety of chemical analyses. Casting, like molding, deals with organic, synthetic, ceramic and metallic materials, reminding us of the scope of the present engineering outlook. In addition to casting troubles already noted, the tendency of many hot materials to unite detrimentally with oxygen must be met frequently. A brief review of common casting methods may prove helpful for the light such review may throw upon subsequent discussions.

Molds and Patterns

Molds for casting iron, etc., are ordinarily made of clean sands selected for grain shape and size (to assure gas venting), bonded with small amounts of clays of sufficient heat resistant capacity for the high temperatures involved and probably reinforced with rods, wires, nails, etc., to withstand stress and erosion. While originally shaped by hand, and later, with tools and sweeps, in present practice a mold requires a pattern formed to the desired shape. It is built into the mold in such a way that the mold may be separated in two or more parts to successfully remove the pattern and to insert baked sand and clay cores, thus leaving a cavity of the shape of piece required, just enough larger to allow for shrinkage. As production and precision demands increase, pattern materials vary from soft woods, hard woods, plaster of paris and possibly plastics to single

o o o

FIG. 19—A typical injection molding die and heating chamber for a thermoplastic. The balance of the injection molding machine includes pressure means on the one side for closing and holding the mold, and on the other, for forcing a heated charge into the mold, together with adjusting and cycle control means. Courtesy Tennessee Eastman Corp.



and multiple metal patterns arranged for rapid reproduction of sand molds with mechanical assistance. For brass and bronze castings, semi-permanent plaster molds help to reduce mold cost per piece. Metal molds and machine handling methods have made production history in the manufacture of articles from molten glass.

Die Casting Practice

Die casting combines long life metal molds, mechanical mold closing and holding, molten metal injection and final stripping of the chilled casting. It is another forward stride in mass production of accurate castings. At first, tool steel dies worked well for the low melting point "white metal" alloys of lead, antimony, tin, zinc and later aluminum. Soon thereafter, the more heat resistant die alloys made possible the die casting of higher melting point brasses and bronzes.

Injection Molding

Injection molding applies much of the machinery and technique of die casting to the production of parts made from synthetic resins or other adhesives and their mixtures. As in Fig. 19, the powder mix prepared to suitable granule size (3/16 to 5/16 in. for Tenite, a cellulose acetate or cellulose acetate butyrate) is delivered from a hopper in measured volume to the path of the injection plunger which forces the charge through the heating chamber and into the die cavity from which the finished part is ejected as the die opens. Production cycles are governed by the time needed for application and dissipation of heat to suit the particular mixture and to permit possible die cleaning and application of inserts. Tables III and IV in the preceding article give data available for typical materials.

If more than one injection unit is used, care must be taken to avoid flaws at the joining weld due to the first bit of defective material, or joint lines due to slightly different shades in different hoppers in color work. The press to close and hold the die and to knock-out the molded part or parts upon opening, may be either a horizontal machine (to drop out small parts) or to save floor space it may be a vertical or inclined press (especially for large parts).

Injection Pressures

Injection pressures necessarily vary both with the interferences to flow of the narrow and intricate passageways, and with the viscosity or fluidity (through changing temperatures), of various proportions of the many resins, flow aiding plasticizers and possible pigments and fillers. The chemical companies recommend pressures 2000 to 50,000 lb. per sq. in. for their various combinations, and long or thin die passageways may raise the requirement to 100,000 lb. per. sq. in. or more. For this reason some machines have provision to change pistons and piston sleeves and all permit pressure control. *Holding pressures* should be figured around 50 to 90 per cent of the product of injection pressure and projected area of the die. Although considerable pressure is lost driving viscous material rapidly through the constrictions of the heating chamber and nozzle, the pressure holding the die closed must be on the safe side to insure against flash.

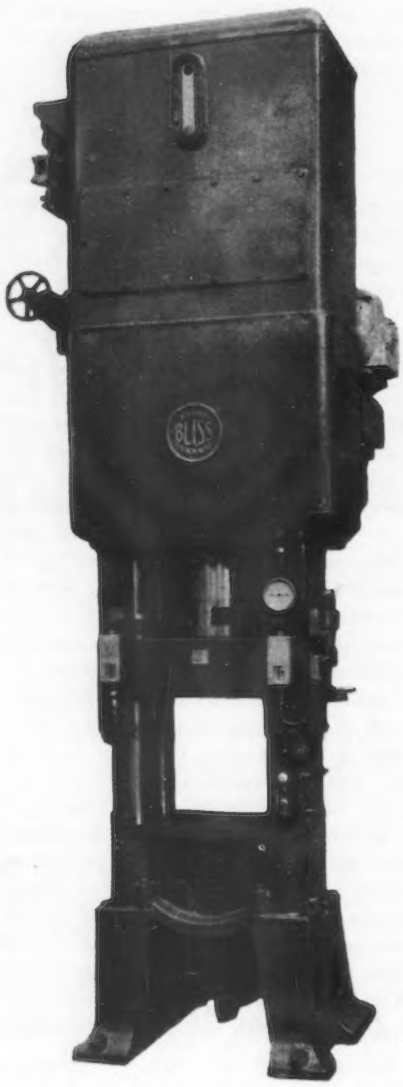


FIG. 20—A 200-ton fast-cycle "hydrodynamic" molding press with bottom cylinder. Its flexibility in this application favors a variety of metal powder pressing operations.

o o o

Heat and time cycle relations in injection molding depend upon whether the material to be handled is thermoplastic or thermosetting. To a lesser extent the cycle relations also depend upon the heat range of the binder and that of the plasticizer and the proportioning of the die sections.

Thermoplastic materials may be heated and reheated so that they need not rush too fast through the heating chamber, and their scrap gates, sprues and trimmings may be regranulated and used again. Being poor conductors of heat, materials of this class must be separated through passages of small cross-section, Fig. 19, to get the heat into them. The walls of such a heating chamber are hotter than the material, so that a halt in machine operation requires that heating be stopped or overheated material be ejected before resuming operation. Thus, a cellulose ester plastic which should be injected at 385 deg. F. might require a cylinder wall temperature of 420 deg. F., but standing at that temperature for 15 min. would be likely to cause darkening or charring. At a normal cycle of perhaps 4 to 6 injections per min., there would be no danger of overheating. Again, due to slow heat transmission, the molded part might be too soft to be ejected without damage unless the die were cooled to some extent (say 100 to 200 deg. F., depending upon the resin and plasticizer). For this reason, such materials are sometimes confusingly called "coldsetting." Too low a die temperature will cause improper filling or internal strains and strain markings in the material so that dies must sometimes be warmed at the start of operation. Fig. 5 suggests the temperature-time relationship necessary for a material in its thermoplastic state to stress-relieve and readjust its molecular structure to its new shape before chilling. Thermoplastic material then must arrive in the die cavity hot enough and stay there long enough to stress-relieve and incidentally long enough so that it cools sufficiently to resist a bump on ejection.

Injection of Thermosetting Materials

Thermosetting materials may be injection molded by heating the individual charge very quickly (by induction or dielectric heating) and getting it right into a hot die to take shape and to hold long enough at the heat to polmerize and set. Due to the chemical change that takes place when the temperature reaches a proper pitch for molecular combination of the resin constituents, the scrap sprues and gates cannot be salvaged.

The hardening in hot setting is ordinarily sufficient to permit safe ejection without cooling.

Die Design

Dies or molds, Fig. 19, are leaning in design toward well known die set construction, with guide pins for convenience in setup. Sprues are tapered for stripping and a cavity is furnished opposite the sprue to take the chilled slug from the end of the nozzle. This cavity is located so the defective material can be trimmed off to avoid damage to the appearance of the part. Knockouts must be substantially backed to hold flush under pressure. Gates in multiple mold dies must not be so small as to restrict a quick fill. In the die body, passages are usually required to permit circulating cooling water for thermoplastics or steam for heating thermosetting materials. Venting, especially at the point farthest from the entrance, must be provided to avoid incomplete fills and charring, due to trapped air and steam. The latter may also cause sub-surface markings so that precautions are essential to keep powders from taking up atmospheric moisture. Vents often need be little more that a scratch or at most a 0.025 in. outwardly tapered hole.

The land or area of contact between halves of the die around the profile of the mold or molds and gates should be as narrow as possible to insure holding tightly. Contact surfaces should be lapped. Passage and sprue holes should be well polished. Many plastic materials contain abrasive constituents and a few like vinylidene chloride and vinyl chloride acetate react chemically with steel (also copper) and make it advisable that dies and heating chamber parts be chrome plated.

Shrinkage allowances must be made to suit both molding temperature difference and time shrinkage recommendations for the particular material. Molding pressure and uniformity of section in the piece and the entry gates are also said to affect shrinkage.

Compression Molding

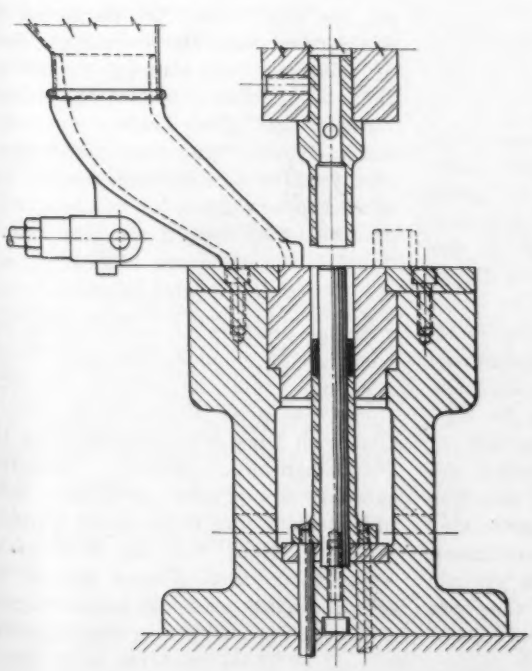
Molding, or preshaping and concurrent or subsequent heating, sintering or baking may be distinguished, though not always too clearly, from the foregoing "casting" methods in which material rendered fluid or semi-fluid before entering the mold, cools or sets in the shape of the receiver. Historically the method dates back to clay bricks and pottery which were molded by hand and baked slowly in the sun and later more quickly by fire. The low production foundry technique of molding sand with clay binder (for subsequent casting) is hardly more advanced. Under such titles as compression molding, briquetting, pelleting, preforming, etc., the method is advanced to the machine stage in the production of pills, buttons, grinding wheels, carbide tools, porous metal bushings, welder tips, tiles, plywood and other laminates, crockery, building blocks, insulators, knobs, tires, caps and on endlessly.

Molding Ceramics

Ceramics, compression molded for general and industrial use, may be typified by Westinghouse Prestite. Its composition is given as flint, feldspar, China clay, ball clay and water. These are mixed, filtered, ground and moistened with water to a properly plastic consistency for molding in conventional hydraulic presses and dies. The molded pieces are conveyed through ovens for drying and then baked under conditions of accurate temperature control to set and glaze.

Actually, each of the clays, chosen from deposits mined in different localities, contains different percentages of about the same six or eight oxides plus chemically combined water, which is the plasticizer. Thus, flint clay contains about 45 per cent SiO_2, 36 per cent Al_2O_3, 3 per cent each of Fe_2O_3 and CaO plus traces of a couple more oxides and about 12 per cent of water in chemical combination. The analysis of ball clay is given much the same but with less CaO and about 18 per cent H_2O. Crystalline feldspars, such as $KAlSi_3O_8$, are alumina silicates of potassium, sodium, calcium and rarely barium. This suggests the chemical complexity of writing formulae for concretes, ceramics and other natural plastics, notwithstanding the fact that the technique of handling them was worked out quite well by the ancients.

Soluplastic and thermosetting seems like a proper way to identify the process although some of the same oxides melted into glass definitely add thermoplastic characteristics. The washed and ground clays are soluble



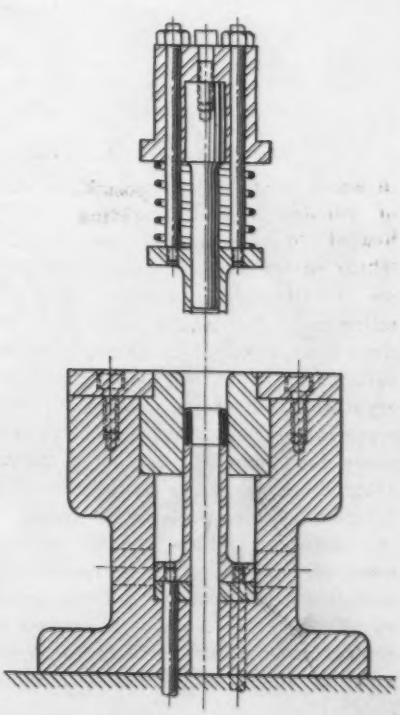


FIG. 21—For producing oil impregnated porous bronze and iron bushings in mechanical presses (Fig. 22) or hydraulic presses (Fig. 20) the die at the left measures the charge (flush fill) and briquettes it for sintering, after which the right hand die squeezes or irons the bushing to precise finished size.

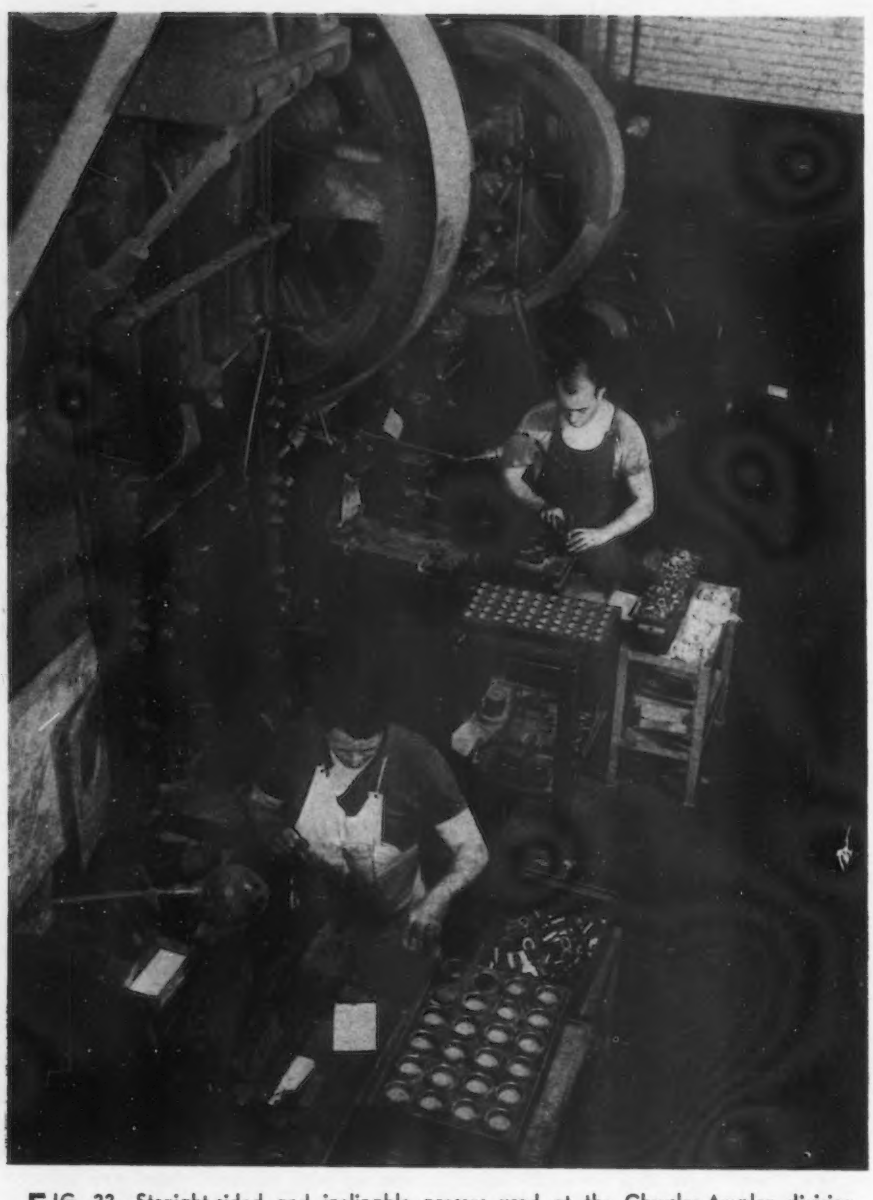


FIG. 22—Straight-sided and inclinable presses used at the Chrysler-Amplex division in the mass production from powders of Oilite bronze and iron bearings. Courtesy The Modern Industrial Press.

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in water which makes possible control of consistency for molding. When heated to the setting temperature, which varies over a considerable range up to dull red (dependent upon constituents), the mixed molecules lose their chemically combined water, soften and contract, similar to recrystallization processes in other materials. They cool to a typical stone-like porcelain which is thereafter impervious to moisture. Differences in recrystallization range of the different oxides and in proportions of natural mixtures necessarily complicates the control. These molded mixed oxides take metal inserts or reinforcements well or adhere to enameling steels as protective finishes. They may be machined between drying and baking and ground after baking. They take many color glazes, are relatively brittle and show tensile strengths of about 5000 lb. per sq. in. compared with 48,000 lb. in compression.

An interesting cross between molded ceramics and powder metallurgy is found in certain (*Permalloy*) telephone and radio cores. Here, for high magnetic permeability, granules of iron and nickel or molybdenum are prepared and coated with a thin film (0.00002 in. approx.) of ceramic clay as an insulator of eddy current losses. The coated granules are die pressed to shape under about 100 tons per sq. in. pressure to a density of about 7.75 g./cc., and annealed to restore magnetic quality, and, incidentally, at a temperature which sets the ceramic as a binder.

Abrasive wheels are molded with pressure, temperature and time combinations to suit the particular mixture. The fillers in the mix are the hard, sharp crystal particles, as of silicon carbide or aluminum oxide in iron oxide, for grinding purposes, with such binders as rubber, the clays, phenol-formaldehyde or other thermosetting resins. Metal insert hubs or shanks may be molded in place. Hydraulic presses and heated dies are used for the resins and rubber or cold pressing followed by drying and baking, for the ceramic clays.

Cemented Carbides

For cutting edges, drawing, extrusion, heading and cold forging dies, spot-welding tips and other points of application of severe and abrasive stress, cemented carbides combine such hard filler materials as tungsten carbide, tantalum carbide and titanium carbide, with such binders as cobalt, nickel and copper. Suitable sized and shaped powders are cold compressed in steel dies and hydraulic presses and sintered or baked in a reducing atmosphere, well up in the recrystallization range of the binder, or hot pressed at similar temperatures in low pressure (1000 lb. per sq. in.) graphite molds, with time allowances for recrystallization of the binder.

The latter method would make for greater density, if die materials were available which would stand up properly to both the pressures and temperatures desired. While compressive strengths of the cured mixtures reach 500,000 to nearly 900,000 lb. per sq. in., the much lower tensile strengths are derived from the 3 to 20 per cent of relatively low strength binder so that the carbides are often molded directly into steel holders or rings. Similarly, powdered copper and tungsten carbide tips molded directly on solid copper electrodes combine conductivity and wear.

Molding Metal Powders

Metal powders of many types are compression molded, following much the same rules as govern the synthetic resins as discussed in connection with Figs. 5 and 6 and Table II. Fundamentally, suitably prepared powders are pressed in dies to suitable density and intimacy of particle contact. Heat for the interatomic welding or bending may be applied either during pressing or more commonly after pressing in the sintering

(baking or recrystallizing) furnace. Subsequent sizing or squeezing operations are common for porous bushings, filters, etc., while further hot pressing or cold forging and intermediate annealing operations are required where greater density is wanted.

Powder preparation for size, purity and proportion in compounding of alloys or mixtures with non-metallic components has been worked out for a wide variety of powders by material suppliers. The size of powders, usually gaged by the standard screen mesh through which they will pass, is highly important to proper flowing, filling and relation of voids in initial compacting. The method of preparation also governs whether particles are more or less equiaxed or relatively flat. The metal powders are successfully handled in much smaller average grain size than the synthetic resin mixtures, perhaps due to somewhat similar proportion in molecule sizes.

The tendency of powder particles to arch and lock, leaving local voids and non-uniformities, has lead to some preference in thin walled sections to compact both from the top and bottom, using hydraulic cylinders above and below in the press. A similar effect may be obtained in properly timed hydraulic or faster mechanical double action presses by moving floating die walls down at half the speed of the compressing punch slide or ram. More general and simpler practice, however, for metals and organic and ceramic mixtures is to compress from the top with suitable knockouts below.

Fig. 20 illustrates a powder metal molding press typical of the fast acting self-contained hydraulic types. This one is being used in compressing copper powders for electrical parts of complicated shape and assemblies of copper powders and rods, sometimes in place in steel stampings. Oil in the tank at the top is the pressure medium, with variable delivery pump and motor at the rear. Limiting positions of the quick advance, the pressing stroke, the quick return, and the knockout (below) are conveniently adjustable. Both pressure and position stops are provided to govern the work stroke.

Making Lubricated Bushings

Porous and oil impregnated bushings for self lubrication are now commonly mass produced in competition with solid bushings. Many of the iron powder bushings use a small percentage of copper as a binder and are sintered in a hydrogen atmosphere, well up in the recrystallization range of copper. At such temperatures a copper-iron solution (eutectic) can form at the contact points to join the iron particles, as in copper brazing. In the bronze bearings, the tin is activated to form the copper-tin bonding eutectic among the copper grains.

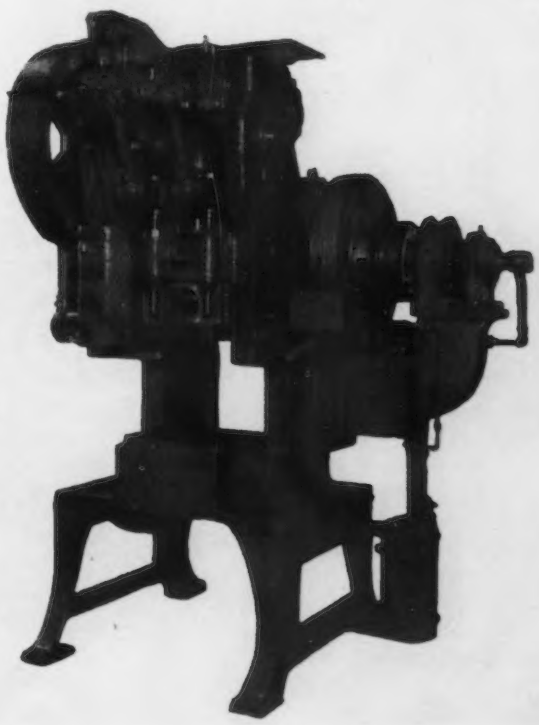
Dies, Fig. 21 (left) for the preliminary molding or briquetting of the powder serve also for metering the charge (for compression ratio in the neighborhood of 3:1) requiring careful uniformity in the preparation of powders and lubricants. After sintering, the dies, Fig. 21 (right) for sizing to precise dimension have much in common with other metal sizing or ironing operations described earlier. Both the briquetting and sizing dies are of substantial construction and, for production purposes, Langhammer and Smith[15] advise high speed steels for dies and punches and oil hardening steels for strippers and knockouts. Allowances for sintering contraction and subsequent sizing are suggested as 1 per cent each on the briquetting die diameter. They specify dimensional tolerances of 0.0002 in. and superfinished surfaces. Such accuracy indicates need for solid frame or keyed housing presses, which are widely used.

Mechanical presses, Figs. 22 and 23, usually with cam actuated, direct or pneumatic bottom knockouts, appear preferable for porous metal production work in view of precision, speed and positive bottom stroke provision. Hydraulic housing type presses[16], give precision plus pressure control for high density compression (20 to 100 tons per sq. in.) for gears and other shaped parts which would otherwise require excessive machining and grinding. Dies for such parts require the rugged construction characteristics of cold forging dies, with hardened backing or load distributing plates, shrunk rings or wedge prestressing of substantial holders to take spreading strains. Some shapes are such as to require split dies and double action presses, Fig. 23. The toggle press illustrated has the outer slide timed to dwell for holding during the sizing of porous bushings and also during stripping. Press working pressures bear obvious relations to the yield point of the material being worked. They are usually below the yield point for porous jobs and above, by a small or large amount, for high density work, depending upon confinement in the die, restrictions to flow, rigidity and speed considerations, etc.

(TO BE CONTINUED)

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FIG. 23 — Double-action toggle presses, used for sizing of porous metal bushings, offer some advantage in die construction and operation over Fig. 21. They also permit closing split molds for other powder briquetting.



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Dolomite Refractories

By J. H. CHESTERS
Central Research Department, United Steel Co.'s, Ltd., Stocksbridge, England

. . . The author concludes his study with a description of the manufacture and properties of dolomite and composite dolomite brick and a discussion of applications. Last week he described the various dolomite systems, raw materials and production of stabilized clinker.

SOME of the earliest dolomite brick to give useful service in steelworks was of the semi-stable type. Originally such brick was made, as with the basic bessemer converters, by grinding calcined dolomite with tar and ramming the mass in large molds. The brick was used almost immediately and no serious trouble was therefore experienced due to hydration. Somewhat more stable brick can be made by adding a flux to the batch and firing the brick in the ordinary way, while the life of such bricks in storage can be further extended by boiling them in pitch after the completion of the firing process. The firing of such bricks is quite a difficult process, there being a tendency for abnormal volume changes to occur during the period when the tar is driven off. The percentage of wasters is therefore liable to be high, but has recently been reduced to such proportions as to permit this brick to be made commercially in considerable quantities.

With stable dolomite brick, the various grain size fractions obtained by grinding the rotary kiln clinker are recombined by weighing out fixed quantities of two or three grain size fractions. These are mixed with water in a paddle type mixer, the grading of brick batch varying over the following range:

	Per cent
Coarse	55 to 75
Medium	15 to 5
Fines	40 to 20

The water content of the batch when used in a hydraulic press is about 4 per cent. For such work the molding pressure used is generally between 10,000 and 15,000 lb. per sq. in. (see Fig. 7).

The drying of dolomite brick has given rise to a number of difficulties in spite of its low moisture content. The cause of these troubles is still rather obscure but it is known that they can be minimized if the drying is done below 104 deg. F. and with a stream of dry, clean air. If the drying conditions are not right, considerable cracking occurs either in the drier on in subsequent firing in the kiln.

The firing is carried out in down-draught kilns, either circular or rectangular, using coal, oil or producer gas as fuel (see Figs. 8 and 9). The maximum temperature lies between 2462 and 2642 deg. F. and is usually maintained for at least 24 hr. If insufficient firing treatment is given, for example, if the soaking temperature is only 2372 deg. F., it is found that the brick contains considerable amounts of free lime which are liable to lead to disintegration in storage. Carlson has shown that tricalcium silicate tends to break down at a temperature of about 2192 deg. F. to give dicalcium silicate and free lime. At a somewhat higher temperature the lime recombines and brick fired above 2552 deg. F. does not show any free lime or any tendency to crumble in storage. A convenient indication of the firing treatment (apart from the disappear-

FIG. 7—Hydraulic pressing of dolomite brick.



ance of free lime) is afforded by the firing shrinkage which is approximately 3/16 in. on the 9 in. length of a standard square.

The above particulars apply to the process of dolomite brick manufacture as employed in Great Britain, and differ considerably from those employed by American companies whose processes have been chiefly described in the patent literature (see bibliography).

Numerous attempts have been made to produce brick possessing special properties by blending dolomite clinker with other refractories, in particular magnesite and chrome. Thus it has been shown that the replacement of the intermediate fraction in a stabilized dolomite brick by dead burned magnesite results in an increase in the thermal shock resistance. The normal figure of two reversals can be increased to as much as 30 reversals by this procedure. Apart from the change in batch composition, the manufacturing technique for this brick and the other composite brick is identical.

Similar brick has been made in which the intermediate fraction is replaced by chrome ore while at the other extreme magnesite brick has been made in which 20 or 40 per cent of the magnesite was replaced by stabilized dolomite clinker. With this latter brick the manufacturing conditions, apart from the change in batch composition, are similar to those employed in making magnesite brick.

Dolomite Brick Properties

A selected analysis of a type of semi-stable dolomite used in Great Britain is a follows:

	Per cent
Silica	4.27
Ferric oxide	2.53
Alumina	2.16
Lime	51.66
Magnesia	38.21
Loss on ignition	1.07

It will be seen that the material does not differ greatly in analysis from ordinary basic as used for fettling open hearth furnaces. The properties of samples of this type are summarized in Table IV, column 1. It will be seen that in addition to a comparatively low porosity and moderately good crushing strength, the brick has a fairly high refractoriness under load and an unusually good thermal shock resistance. Furthermore, its resistance to slags rich in iron oxide and lime is greater than that of the ordinary stabilized dolomite brick. It has one serious limitation, namely that it can be stored only for a limited period, since it contains a large amount of free lime which ultimately hydrates.

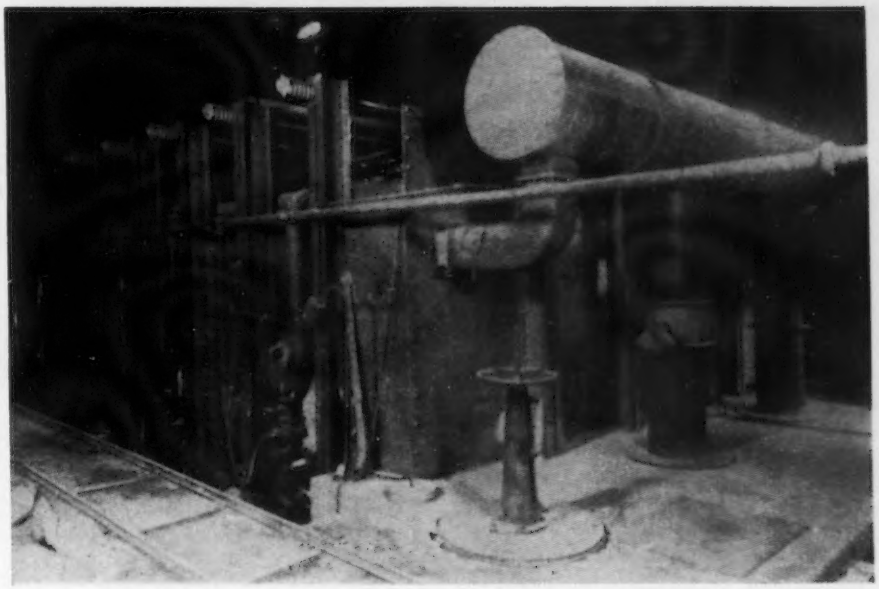


FIG. 8—Dolomite brick kiln fired with producer gas.

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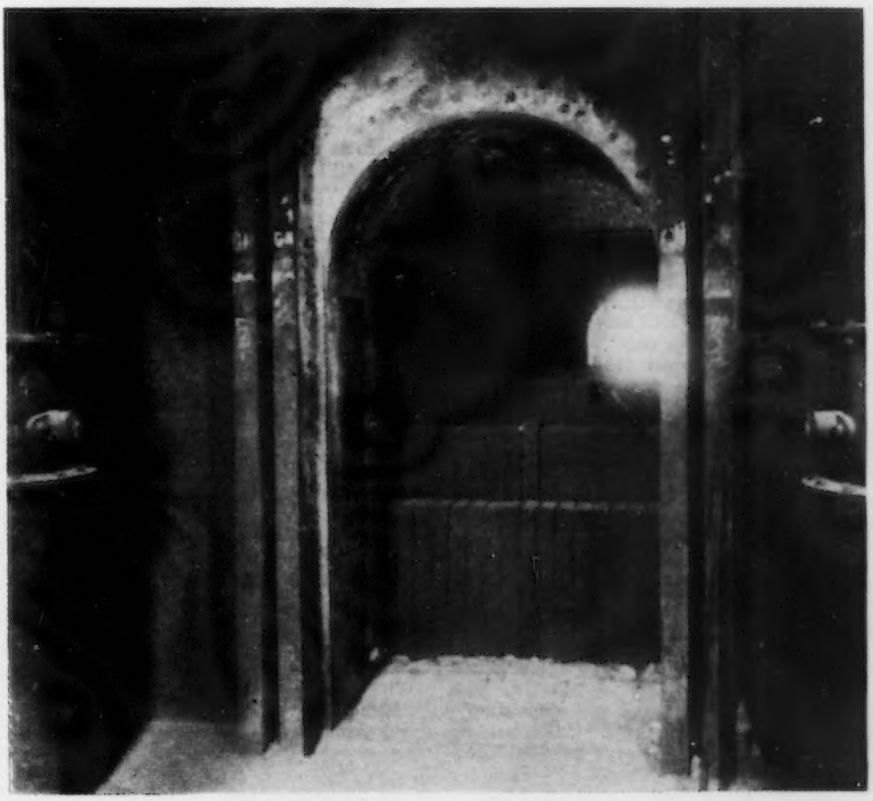
The general properties of stabilized dolomite brick have already been given in the section dealing with basic open hearth furnace bottoms (THE IRON AGE, Aug. 7, 14, and 21, 1941). A selected analysis of one such brick is as follows:

	Per cent
Silica	14.44
Ferric oxide	3.44
Alumina	1.50
Lime	40.04
Magnesia	40.30
Loss on ignition	0.25

X-ray examination of brick of this type (Fig. 4) shows that it consists

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FIG. 9—The setting in a dolomite brick kiln. Note the height and absence of boxing.



essentially of tricalcium silicate and magnesia. The porosity and permeability are about the same as those of magnesite, while they show equally good volume stability at 2732 deg. F. Their cold crushing strength is high, as is also their refractoriness under load, whether determined by the rising temperature or the maintained temperature test. In general, their thermal shock resistance is poor compared with that of magnesite brick (two reversals as compared with 6 to 30 or over for magnesite). In addition to the properties already given, the following are of interest to the steel plant:

Thermal Conductivity: At 1832 deg. F. mean this is about 15 B.t.u. as compared with about 25 B.t.u. for magnesite. The replacement of magnesite brick in open hearth or arc furnace bottoms by dolomite brick is therefore equivalent in some measure to insulation.

Specific Heat: The specific heat over the temperature range 1402 to 68 deg. F. is 0.255 which is close to that for most fireclay and silica brick.

Thermal Expansion: Over the temperature range 68 to 1832 deg. F. the expansion of a stabilized dolomite brick is about 1.3 per cent, which is about the same as that given by magnesite brick.

Slag Resistance: Dolomite brick shows good resistance to molten steel, but has a resistance to iron oxide lime slags that is definitely lower than that of magnesite or basic. This is brought out by Fig. 10, which shows the effect of heating up blocks varying in composition from magnesite to stabilized dolomite, in contact with a 4/1 ferric oxide lime slag. It will be seen that the attack is least for the magnesite and worst for the stabilized dolomite.

Free Lime: Stabilized dolomite brick should not show any appreciable amount of free lime either by White's test or the glycerol test, and should not disintegrate when boiled in water for 24 hr.

Composite Dolomite Brick

A typical analysis of a dolomite-magnesite brick in which the intermediate section (20 per cent) was replaced by magnesia, is as follows:

	Per cent
Silica	11.36
Ferric oxide	3.24
Alumina	1.60
Lime	31.40
Magnesia	51.60
Loss on ignition	0.14

The properties of this brick are summarized in Table IV, column 2. These are similar to those of stabilized dolomite brick but the thermal shock resistance is somewhat greater. Batches have been made in which the thermal shock resistance was much higher (15 to 30 reversals) but the problem of maintaining such values both in brick making and in use, is considerable. The specific heat of a brick of this type was found to be 0.255, while its thermal expansion (68 to 1832 deg. F.) was 1.26 per cent.

No detailed description of dolomite-chrome brick will be given although a considerable amount of laboratory test data are available. It possesses one serious limitation, namely the tendency of the chrome to react with the dolomite clinker at the working temperature, forming a great deal of melt. This results in serious softening which has so far prevented the commercial application of these brick in open hearth furnaces.

Trials have also been made of magnesite brick in which 20 or 40 per cent of the magnesite was replaced by stabilized dolomite clinker. The properties of such brick are summarized in Table IV, columns 3 and 4. It will be seen that the samples examined had a low porosity, a high refractoriness under load, and an unusually good thermal shock resistance. Slag tests using the 4/1 iron oxide/lime mixture referred to above (see Fig. 10) showed them to have a resistance only slightly inferior to magnesite itself. Practical trials in large tilting furnace back walls have shown that the 80/20 type gives a life approximately equal to that of the best chrome-magnesite brick, but that with the 60/40 type the slag resistance is definitely inferior.

Applications

The first successful trials on stabilized dolomite brick in Great Britain were carried out by United Steel Co.'s Ltd. in 1934. They showed that this type of brick gave service equal to that previously obtained with magnesite when used in basic open hearth furnace tapholes. Since then, and particularly since the outbreak of the

TABLE IV

Properties of Various Bricks Containing Dolomite
(Swinden and Chesters)

	(1) Semi-Stable Dolomite Brick	(2) 60/20 Dolomite-Magnesite Brick (Special Grading)	(3) 80/20 Magnesite-Dolomite Brick	(4) 60/40 Magnesite-Dolomite Brick
Porosity, per cent	22.8	26.4	19.2	20.4
Bulk density, gm. per c.c.	2.52	2.50	2.79	2.72
Specific gravity (by porosity)	3.27	3.40	3.45	3.41
Crushing strength (9x4½x3 in. brick, on end). Lb per sq. in.	3680	4700	8740	7380
Permeability (perpendicular to 9x3 in. face, through 1 skin). c.g.s. units	0.29	0.36	0.121	0.097
After-contraction (2 hr. 2730 deg. F.) per cent	1.2	0.7	0.2	0.7
Refractoriness under load, deg. F. (50 lb. per sq. in.)				
Initial softening	2480	2600	2490	2550
Rapid softening	2760	2730	2740	2870
Fail	2930	3090	3000	3110
Refractoriness under load. (25 lb. per sq. in. maintained at 2910 deg. F.)	....	10 per cent deformation after 49 min.	....	....
Thermal shock resistance (No. of reversals required to produce failure).	23	5	15 >26	13 16 } 15
Slag resistance (when tested with $4Fe_2O_3 - CaO$, slag at 3000 deg. F.	Definitely higher than stabilized dolomite brick. No "bursting" expansion with iron oxide	Similar to that of stabilized dolomite brick. No "bursting" expansion	Only slightly inferior to magnesite. Show volume stability at this temperature	



FIG. 10—Effect of a 4/1 ferric oxide/lime pill on (left to right) 100/0, 80/20, 60/40, 40/60 and 0/100 magnesite-dolomite briquettes after 1 hr. at 3000 deg. F.

war, their use has been extended to the whole of the sub-hearth of fixed open hearth furnaces and to the top layers of the sub-hearths in tilting furnaces. They are also extensively employed in the front, back and end banks, in splays in tilting furnaces and in those reheating furnace hearths where the conditions are too severe to permit the successful use of fireclay brick.

In arc furnace bottoms they have given service equal to that expected with straight magnesite brick.

Semi-stable brick of the type described in Table IV, column 1, has given excellent results in the side walls of arc furnaces and indeed are considered superior in this position to either magnesite or chrome magnesite brick. It possesses the further advantage over chrome magnesite brick that it cannot lead to chromium pick-up in the steel. It is also used in the top layers of the sub-hearth in some arc furnaces. In some plants, particularly on the Continent, the side walls of both arc and open hearth furnaces are constructed with pressed tarred blocks (see Fig. 11) which are said to have a good life. In general, however, these are employed only at plants where such blocks are used in basic bessemer converters. A more common practice is that of ramming side walls from graded basic either dry or mixed with tar. Walls of this type when suitably built are found to give a life approximately equal to that of magnesite brick.

More recently, stabilized dolomite clinker has been employed in the production of basic ladle linings. The aim has been to achieve certain metallurgical improvements rather than greater life of the refractories. Considerable success has been achieved in preliminary experiments but further tests will be required before any estimate can be given of the extent to which such linings are likely to replace the normal fireclay brick.

Particular attention must be given in using dolomite brick to the cements employed. With stable brick, water can be used and the cement consists essentially of finely ground clinker. Semi-stable brick is either set dry or with a cement having a tar or oil base. In addition to these cements used for setting brick, plastic stabilized dolomite ramming materials are now available for repairs to tap holes, and for ramming reheating furnace hearths, etc. Here again the work is still at an early stage, but the results so far obtained suggest that such cements will give service comparable with that already obtained with cements having a chrome ore base.

Acknowledgment

In conclusion, the author desires to express his thanks to Dr. T. Swinden, director of research, United Steel Co.'s Ltd., for permission to publish this article, and to his colleagues in the steel and refractories industries for their constant collaboration.

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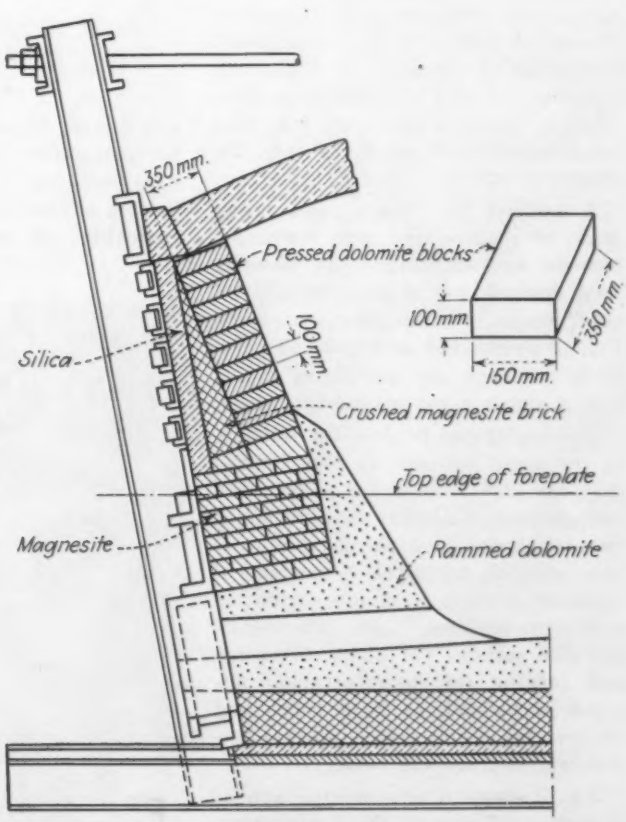


FIG. 11—Back wall of 150-ton open hearth furnace showing use of pressed (unfired) dolomite bricks (after Sittard).

Mechanical Ingoting

of Aluminum and Magnesium Turnings

. . . This is a description of a method approaching the production stage, for recovering magnesium and aluminum turnings and grindings by de-oiling and briquetting into nearly solid blocks. The author for many years operated large scrap treatment and shipwrecking yards in Europe and developed numerous successful methods of treating ferrous and non-ferrous scrap.

By MAX STERN

Manager, Metals Recovery Division, Loma Machine Mfg. Co.

TREATMENT of turnings and borings and similar finer grades of scrap has lately been one of the most pressing problems in the treatment of ferrous and non-ferrous scrap. These materials are today, and will be in the future, one of the main items on the scrap market. This kind of scrap merits particular interest because it always originates from fresh metals—therefore, it is possible to segregate and classify it carefully. If this scrap changes hands frequently, as it ordinarily happens, it will of course be increasingly difficult to keep the material uncontaminated and segregated. Therefore, this type of scrap should be treated at the point of origin. In this way the first step in real modern scrap recovery is taken, and not only the basic metal is saved, but also the expensive alloys.

A method for "mechanical ingoting" of magnesium and aluminum borings and turnings has recently been devised and a quantity of "ingots" made in pilot plant operation. Fig. 1 shows cut and polished surfaces of such an aluminum ingot; Fig. 2 shows a cut magnesium ingot.

The ingots can be used for melting, in the same manner as cast ingots; they can also be used for deoxidation and alloying. Complete evaporation of water and oil, and precise temperature control during the mechanical ingoting process, eliminate oxidation and contamination risks. The ingots are also suitable for direct extrusion and forging for manufacturing finished parts such as rods, tubes and shapes for applications where mechanical stresses are moderate.

Fig. 3 shows a photomicrograph of a section of one of these aluminum mechanical ingots. A chip layer can be seen across the center of the picture, outlined by thin voids. At the bottom of the photograph can be seen indications of the former boundaries of a chip layer, which has been broken up.

Figs. 4 and 5 show sections of aluminum rod, extruded from one of the mechanical ingots. The chip lay-

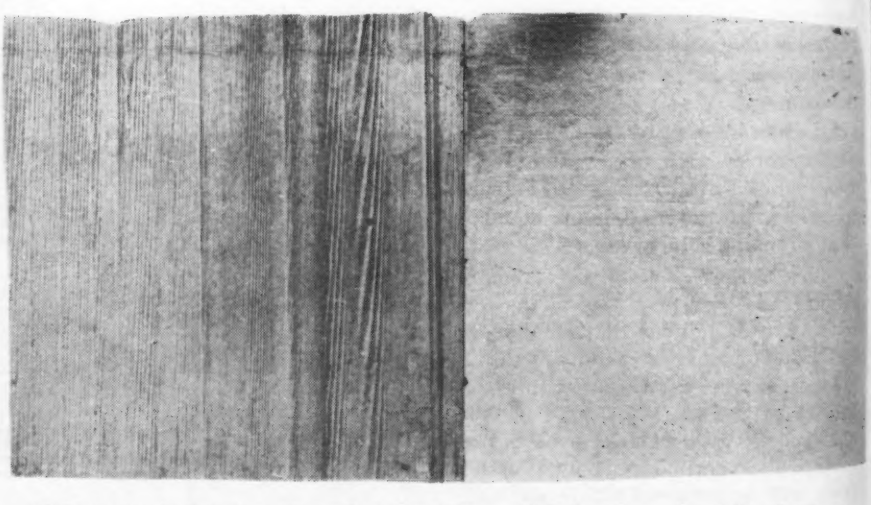


FIG. 1—At the left is a cut, and at the right a polished surface of a 9-lb. aluminum mechanical ingot, 6 in. in diameter.

ers have been completely obliterated. Figs. 6 and 7 show a magnesium mechanical ingot, before and after extrusion.

If boring, turnings, chips, etc., are carefully segregated, it follows that large uniform lots of mechanical ingots can be turned out, with guaranteed analysis of each lot. At present, even if this careful segregation is secured, the trouble with the physical shape of turnings is not yet eliminated, when remelted. The surface area of this kind of scrap is a moment of great importance in the metallurgical evaluation of the melting process. The exposure of large surfaces to the action of heating gas and air is highly detrimental to quality. Influence of oxides and gas and losses of important alloying elements change the original quality of most of the scrap. Expensive fluxing and replacement of the lost alloying is necessary in order to produce an ingot which can be compared with the same quality of the scrap. Thus, the great advantage of the segregation work is partly taken away.

For instance, the following table shows the surface area of light metal scrap in comparison with a solid cube of the same material.

	Sq. In. of Surface Per. Lb.
Aluminum turnings	2500 to 3000
Aluminum sheet metal scrap, average 3/64 in.	575
1-lb. cube of aluminum.	26
Magnesium turnings ..	5000
1-lb. cube of magnesium.	38

It was finally found by the author after researches in France, which were terminated by the armistice, that only by hot compressing with temperatures far below the melting point, combined with preliminary deoiling and drying, could the surfaces be completely reduced to a minimum. Normal briquetting, even with dry turnings, reduces the surfaces insufficiently.

Fig. 8 illustrates the production line of a mechanical ingoting plant, similar to one designed for the Societe L'Aluminium Francais and partly under way at the time of the fall of France. Patents* for the process have been granted and others are pending.

* *Nos.* 2,299,043; 2.302,980; *British* 540,-105; *Canadian* 477,027.

The oily and wet turnings, borings and filings that are of shoveling condition are discharged into the pit, A. The bushy part is screened out by a vibrating screen and crushed by the crusher, H. From the pit, the material is conveyed by the bucket elevator, B, into the rotary dryers, C-1,



Fig. 2—Cut surface of a 6-lb. magnesium mechanical ingot, 6 in. in diameter.

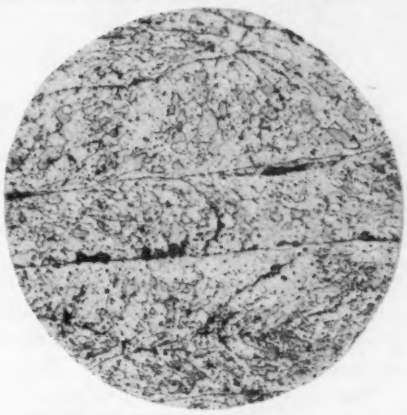


FIG. 3—Photomicrograph of a section of aluminum mechanical ingot. Across the center of the picture can be seen a former chip layer, while at the bottom of the picture is a similar layer which has been destroyed. Enlarged to 100 diameters.

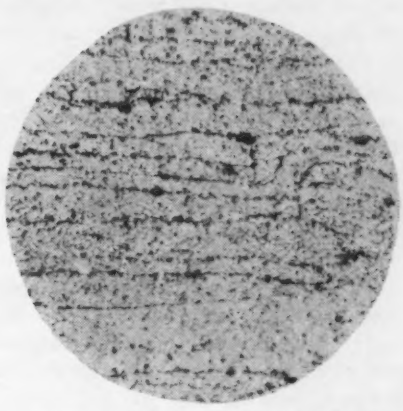


FIG. 4 — Photomicrograph of a cross-section from an aluminum rod, extruded from a mechanical ingot. Enlarged to 100 diameters.

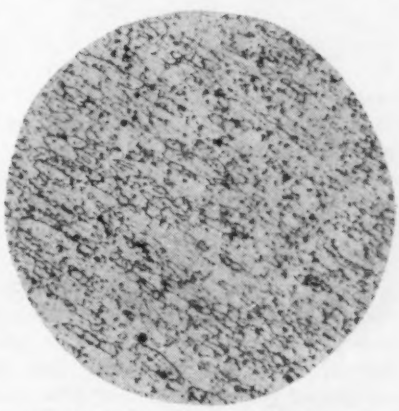


FIG. 5—Photomicrograph of a surface section from an aluminum extruded rod, made from a mechanical ingot. All evidence of chip layers has disappeared. Enlarged to 100 diameters.

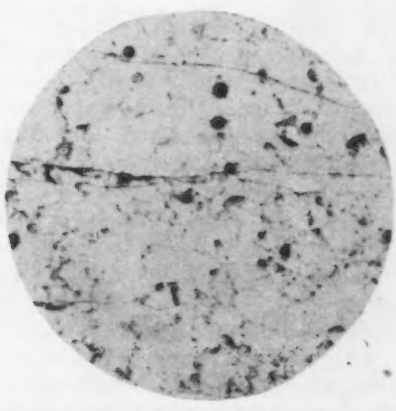
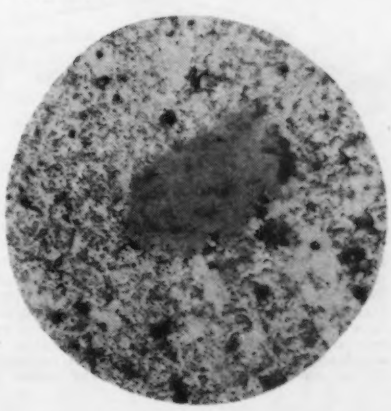


FIG. 6—Photomicrograph of a section of magnesium mechanical ingot. Enlarged to 100 diameters.



LEFT

FIG. 7—Photomicrograph of a magnesium rod, extruded from a mechanical ingot, showing no evidence of chip layers. Enlarged to 100 diameters.

C-2 and C-3. The time allowed for drying in each dryer, is about 10 min., depending on the content of oil and moisture. After passing through dryer C-1, however, the material passes through the magnetic separator, J, then through the other two dryers where any remaining moisture and non-metallic impurities are eliminated.

From the last dryer, the turnings are delivered to hopper, D, connected to the press, E, and are there compressed into a heated steel die in which they are condensed to about 50 per cent or 60 per cent density.

The filled die is pushed into the circular pusher type furnace, F, and heated to the final pressure temperature of between 500 deg. and 850 deg., F., depending on the alloy being processed. Time for heating each metal body in the furnace is 30 to 45 min.

The heated metal and die are then returned to the press, where the metal receives its final compression into a solid ingot of practically 100 per cent density.

Sixty dies are in use at one time, with one being put into the furnace and another withdrawn every 30 sec. The heat remaining in the die at the time it receives a new load of turnings is sufficient for the first heated compression.

The described plant provides for a production of 12,000 lb. of magnesium or 17,500 lb. of aluminum per 8-hr. shift. Metal recovery is practically 100 per cent.

The average cost of production of such ingots is about 1¼c a lb. for magnesium and ¾c a lb. for aluminum, exclusive of equipment depreciation and a moderate royalty.

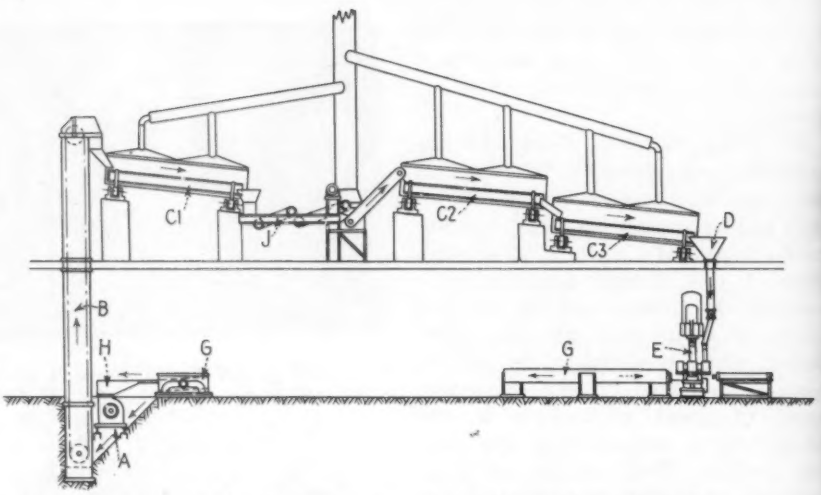


FIG. 8—Diagram of the production line of a mechanical ingoting plant. A represents the loading pit, H a crusher, B a bucket elevator, C-1, C-2 and C-3 rotary dryers, J a magnetic separator, D a hopper, E the press, and F a pusher type furnace.

New Metal Etching Method

A NEW electrolytic etching process for metals, described by the British *Sheet Metal Industries*, makes use of a standard waxed paper stencil such as is used on a duplicating machine, on which is typed or printed the required words or designs. This is placed between the metal article, which forms the anode, and an absorbent pad containing the etching fluid, which is connected to the cathode of a 15-volt d.c. circuit.

This process, says the article, provides a new, cheap and simple method of etching trade-marks, part numbers, patent numbers, or designs on to the surface of metals. The method is rapid and simple to operate, and gives pleasing results, particularly on hard or stainless alloys such as high-speed steel, stainless teel, Stellite, etc. It can be applied to brass, nickel, or any metal. It enables a number of small articles to be etched in the same time as taken for one article. A whole sentence can be etched as rapidly as one word. It has no limitations in the complexity of the design which can be transferred, provided only that a stencil can be cut.

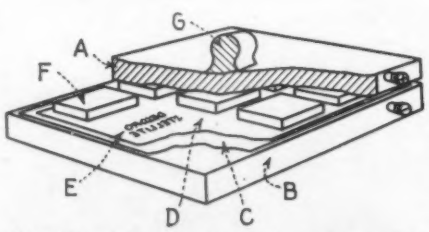
The part to be etched is placed in the apparatus as shown in the accompanying drawing.

The current is then turned on for a period varying from 5 sec. for a small design to 10 sec. for a larger one, or even 30 sec. where, say, 20 metal objects are being etched at once. The current varies from 2 amp. up to approximately 10 amp. for a large number of articles. It is important in the latter case that sufficient mechanical pressure is maintained to insure good contact with each specimen. In placing a specimen upon the stencil, no part of it should touch the bare pad, otherwise it will become etched. It is not necessary for the surface of the metal article to be free from grease before engraving, since greasy surfaces etch quite well. When etching stainless or corrosion-resisting metals, each cut in the stencil is good for at least 15 etchings, the life being limited by the tendency of the stencil to become burned and the etching to become blurred. The life of the stencil is reduced to about 10 engravings with less corrosion-resisting metal such as mild steel, as the dielectric properties then become impaired.

The normal depth of the engraving is about 0.0005 in., and an important feature of the process is that in no way is the structure of the adjacent metal altered, nor is the surface of the metal embossed, but remains perfectly flat. The etching appears as a silvery color on mild steel and is more brilliant on stainless metals. It can be filled afterwards if desired.

Round or curved articles can be rolled over the stencil whilst in contact with the top block, or, alternatively, awkwardly shaped or large articles can be etched by fitting the waxed stencil to the curved face on a hand blotting-pad, and making the necessary electrical connections to the metal body of the hand blotter and the article.

The apparatus is handled by Griffin and Tatlock, Ltd., Kemble Street, Kingsway, London, W.C.2.



SHOWN above are the blocks used as anode and cathode for the etching. B is a graphite baseplate connected to the negative terminal of the d.c. source. On the surface of this block rests a pad, C, which is damped with the etching fluid, upon which the stencil, D, is placed face downwards. The metal object, F, is placed face downwards on the stencil and electrical contact and pressure is provided by placing the weighted graphite block, A, which is connected to the possitive terminal, on the metal.

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• If talk of producing one million trucks in 1944 is true, another conversion job may be needed, particularly since many heavy duty types are reported to be included . . . Jeep continues to hold high degree of interest.



DETROIT—Manufacturers and suppliers have been weighing the implications which attach to recent overtures from WPB and the military that indicate official plans, still in the talking stage perhaps, for production of nearly a million trucks in 1944. Such output, if ordered, would exceed any total already announced or indicated for next year, the current accepted figures being 80,000 trucks for civilian use, plus an unspecified number of military vehicles.

The new figure approaches and nearly equals the industry's top figure for truck production in any previous year, the million-plus record set in 1941. Otherwise truck production totals have always run below the million level.

Affecting the industry's production possibilities is the introduction of one very important tentative specification in the projected totals: About 150,000 of the trucks are to be heavy-duty types of prime movers. For these, gear-cutting equipment and axle-building facilities do not appear to be available. The heavy-duty truck axle and transmission are hardly more than nodding acquaintances in the factory with the normal sizes of axle and transmission. The ring gear of a heavy-duty axle would slide easily over a passenger car transmission, or even a lighter truck transmission. It follows that axle and transmission plant facilities used on ordinary trucks will need important new equipment to produce heavy-duty units in the numbers indicated above.

The problem here is parallel to that encountered when the industry undertook to manufacture tanks, but the quantities are much larger. In fact, for an industry turned inside-out to change from autos and trucks to war goods just two-and-a-half years ago, this new project means literally another conversion job.

NOT an industrial question, but certainly one to conjure with in passing, is that of the reasoning behind such projected schedules. An unknown in the total is the number of military vehicles, but equally unknown at present is the proportion intended for civilian-industrial use. Mixed with these two is a factor which must account for possible demands from our potential army of occupation. The unusual percentage of heavy-duty trucks may be accounted for in this factor. It is not hard to imagine that Europe's war-ravaged railroads will need rebuilding, and that highway prime movers may haul a lot of goods across Europe in the next year or two.

From the heavy prime mover to the jeep is a long step, but the two have shared interest here. During the past week there occurred an incident which may well be used to show how much interest there is in the jeep. The incident involved the arrival in town of a John Cunningham, who told the newspapers that he was Henry Kaiser's vice-president in charge of production. He had just purchased for Kaiser, he said, a small metal-working plant which foreshadowed mass production of the new much-heralded super-jeep. Front-page stories were followed in the next day's editions by denials telephoned from California by Kaiser. Later, enveloped in a hangover and surrounded by four newsmen with Army investigators and the FBI, Mr. Cunningham admitted in a hotel lobby at 4 a.m. that he had invented the story. He was, he claimed, an employee of Kaiser's purchasing department, but that was denied by the Big Boss.

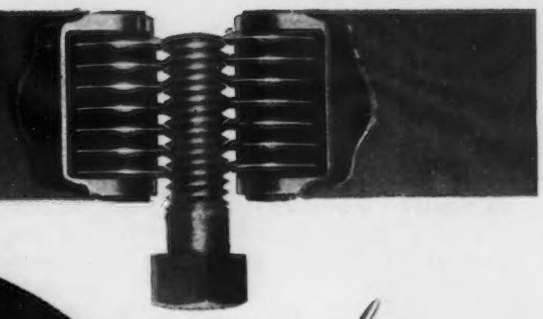
Some have hazarded a guess that the incident was part of a staged publicity stunt to put the Kaiser jeep on the front pages. If it was, it was carrying coals to Newcastle, because the jeep and Kaiser seem to be consistently a jump ahead of the press agents.

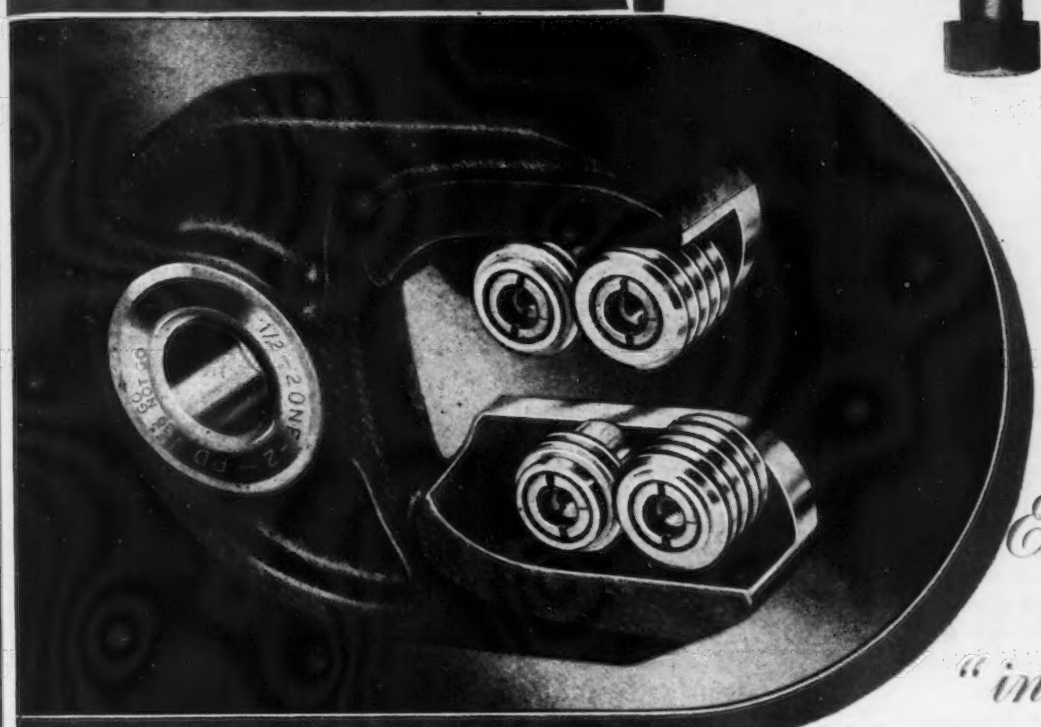
The incident did, however, provide a distraction from the scene of activity where the first of the new Kaiser jeeps was undergoing initial proving ground tests. What happened behind the high board fence at the proving ground will not be told until the Army is ready, but last week the military

RUN BY GASOLINE: A motor run by gasoline produced from coal was demonstrated at the Capitol when hearings began on a Senate bill authorizing government construction and operation of demonstration plants for producing synthetic liquid fuels from coal and other materials. Left to right: Secretary of Interior Harold Ickes, first witness before the committee; Senator Joseph A. O'Mahoney, chairman of the War Minerals Subcommittee of the Senate Committee on Public Lands and Surveys; Rep. Jennings Randolph of W. Va.; Senator Chan Gurney of South Dakota, and Senator Abe Murdock of Utah.



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did take delivery on its sample model.

Meanwhile, the task of readying other new super-jeeps (lighter in weight than the present types by about half, it is rumored) goes ahead in two or three other competitive plants.

BOTH the programs mentioned above—that on heavy trucks and on jeeps—are in the very earliest planning stages, and it will be months before concrete results are observed in either case. They are illustrations of how far ahead the details of the war must be planned, as is another incident that has caused chuckles since it was first reported in Detroit a few weeks ago. This incident involved the skippers of ships, loaded with spare parts for military trucks, who arrived in North African waters and sailed serenely into a German-held harbor—three days ahead of the Allied land forces who were scheduled to rout the Nazis! It is said that some cargoes never touched land between departure from the United States and arrival in Africa, so it is apparent how far ahead the "big show" must have been planned and scheduled.

Entering into calculations of current and future output is the difficulty being encountered in hiring and keeping unskilled labor. Manufacturing plants are hit when they cannot get sweepers, porters, etc., but foundries and some others are more severely hit. Those which normally employ large numbers of unskilled workers find that it is hard to compete against the lure of a short course in riveting, welding or some other subject, which is quickly followed by wages which start in the 90's but run up to 15 or 25 cents above the dollar mark. It is anticipated, however, that the effects will be shown in further shortages of castings, and other products in which unskilled labor plays a prominent role, unless remedial measures are applied.

Another indirect effect which is feared by industry is the one that may follow the drafting of married men and fathers on a larger scale this fall. Such a practice can be expected to bring increased social pressure (in fact, already has in many spots) for the drafting of all single men, no matter what special skills they may have. In certain fields, aviation being an example, young men predominate, and many of them are unmarried. It might follow that 25-30 year old airplane stress analysts or airplane designers, for example, will be called by Selective Service, despite the impossibility of replacing them. If a few are called, the others, as long as the services are anxious to obtain technical officers, will be tempted to "jump in."

In line with what is reported to be an order trimming thousands of desk officers from their jobs, drastic reductions have been made in civilian and military personnel attached to War Department offices here. The Ordnance District Office and the Tank-Automotive Center will be trimmed sharply from their recent totals, said to have been 12,000.

William B. Stout, versatile and always interesting head of the Stout Research Division of Consolidated Vultee Aircraft Corp., has recently aired in a company house organ some of the postwar plans for aircraft which he is currently developing. He has in mind three aerial vehicles, all of them having roadability as well as airability. One is the Aerocar, or flying automobile, for family touring and skyfaring. The second is the Roadable Airplane, designed basically for flying, but adaptable to the road to the extent, at least of being driven from the garage to the airport, or from the airport to the movie palace. The third is the Helicab, an all-purpose helicopter type of craft.

As is well-known, the roadable type of airplane has been built and operated—several versions of it. The designer and builder of one of the successful ones is a consultant to Stout now, as are several other specialists who round out the program which Tom Girdler's organization is readying for 194X.

Stout also has revealed that the first model of the Roadable Airplane will be completed at his Dearborn (Mich.) laboratories in six or eight weeks. A predecessor plane, also built there, was destroyed by a hangar fire at an airport last year.

Special Steel For Aircraft Developed By M. Fleischmann



• • • **Three years ago** American aircraft engineers realized that if a special, tough, heat-resistant steel for a vital part of the turbo-supercharger could be developed it would add thousands of feet to American aircraft ceilings. The call for this steel went out. Martin Fleischmann, remembering World War I when he piloted a German high altitude observation plane, went to work at once to help provide the necessary steel. He was successful, even beyond his fondest hopes. He is hailed by his employer, Timken Roller Bearing Co., as the inventor of a new special steel which enables United Nations airplanes to fly above effective anti-aircraft fire.

Because of his interest in high altitude flying, and airplane engine design, Fleischmann entered the University of Munich after the war to study mechanical engineering. Metallography, the study of the structure of metals, was a relatively new science then and it fascinated Fleischmann. He decided to specialize in it and after graduation remained at the university as assistant professor of metallography.

Fleischmann became discouraged with German economy and so disgusted with German politics that he came to America in 1924. He arrived in New York City without friends and with only $50. He jumped from one job to another, but finally came to Canton in 1928 to take charge of the metallographic laboratory of the Timken Co.

Retroactive Pay Increase Affects 3000 Steel Workers

Pittsburgh

• • • **The War Labor Board** has revised its decision affecting the date of the 5½c. per hr. increase award to 2200 district steel workers.

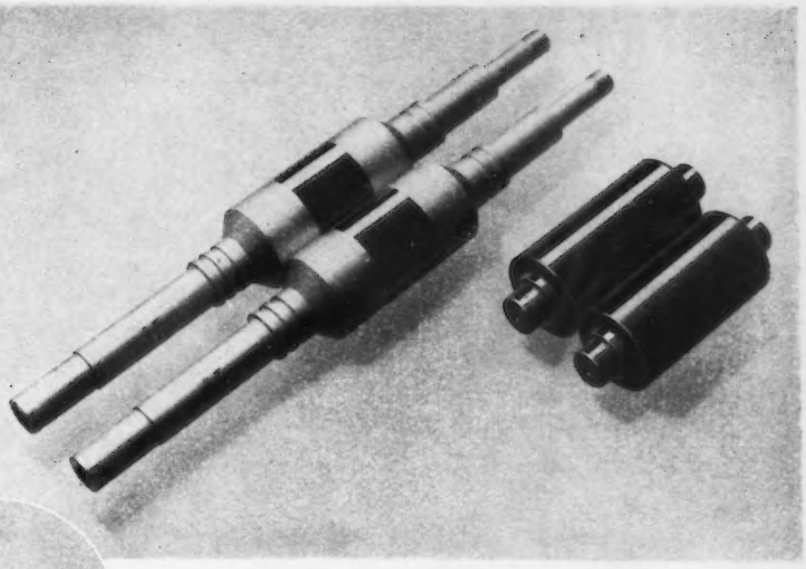
About 1400 employees of the Oliver Iron & Steel Corp. will receive this hourly increase retroactive to Feb. 15, 1942, instead of July 24, 1942.

Also, 800 employees of the Flannery Bolt Co., Bridgeville, have been granted a like increase retroactive to Feb. 15, 1942, instead of July 1 as originally decided upon.

Alan Wood Steel Co. Reports

• • • **Alan Wood** Steel Co., Conshohocken, Pa., and subsidiaries reported net income for second quarter of 1943 at $112,565, subject to provisions of the renegotiation act. Six months' earnings for 1943 were $287,351 vs. $388,854 in the initial six months of 1942.

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At the upper right are shown two sets of rolling mill rolls, typical of many jobs of this nature produced at Lincoln Park. Both of these sets were held to within a few millionths of an inch in rotundity. Their finish is measured as a fraction of a microinch. Because of the wear-resistance of these precision rolls, frequent replacements with reconditioned rolls, and resulting machine "down-time", have been eliminated. After three years of constant use, rolls similar to these are still in service.

The lower illustration shows a burnishing wheel, a burnishing nest, and work holding centers—all of solid cemented-carbide. The wheel burnishes on either the periphery or face. It must be held to extremely close tolerances to produce precise pivots and bearing surfaces. Runout is practically zero.

The burnishing nests, used for supporting parts during the burnishing operation, have an extremely smooth lapped finish. The centers have a lapped female center in the tip. On these centers, concentricity with the body is highly important.

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Washington . . .

L. W. MOFFETT

• Continuous mill plates will be used on Victory ships . . . Maritime asks for more steel in fourth quarter to build additional vessels . . . With post-war export sales facing bugaboo of high prices, some thought is centered upon possibility of subsidies.



WASHINGTON — Victory ship construction will take plates from the continuous strip mills, the same as EC2's do, the Maritime Commission reports.

California Shipbuilding Co., however, will take sheared plate from Kaiser's Fontana plant. Victory ships will carry approximately 10,500 tons, the same as the Liberties. Victories will take more steel, about 10 per cent more than the EC2, but they will be about 30 per cent faster.

Maritime may build an additional 2,000,000 tons of shipping over and above the 19,000,000 tons the President recently said would be built this year. Maritime has asked WPB for additional steel in the fourth quarter to do this.

The way the request for more steel came about is that to build the authorized program of 19,000,000 ocean-going tons, Maritime was forced to accelerate the shipbuilding rate at mid-year to 21,000,000 tons. Maritime says that if more shipping is to be built next year, it is reported, the steel supply must be filled at a 21,000,000-ton level. The accelerated building rate is claimed to have seriously hit steel inventories in shipbuilding yards.

However, dispute has been raised over this point. The largest shipyard on the East Coast was able to contribute 12,000 tons of steel to the "Share the Steel Drive" and another East Coast yard is said to have as much as three to four months' inventory of fabricated steel on hand.

The necessity for so much shipping is questioned by some observers. Apparently, the United States does not have enough goods to fill the ships being built because Britain has been given 200 ships. The reason this was done, it was said, is that this country does not have the crews to man them. This reason is likewise questioned since the United States has more men between the ages of 18 and 49 than any country with the exceptions of China and India.

IN the rehabilitation aims of the United States, apparently no thought has been given the fact that the bombing of war factories is likewise the bombing of peace factories—that many of the countries held by Hitler have been practically bankrupted. Foreign trade experts say these countries are not going to be able to buy steel on the old basis and will not be able to buy American steel extensively anyway because the steel of other countries will be subsidized both as to price and long-term financing.

Government officials who have recently returned from England say that the Lehman group is not planning to ask for any great amount of steel for such purposes. Neither is the British Ross-Leith Committee asking for American steel for reconstruction purposes, it is reported.

To illustrate present thinking, WPB says that Governor Lehman is asking for a mere 20,000 tons of steel in the fourth quarter. This steel is to be made into tractors.

Rehabilitation plans now embrace the giving of food, clothing, seeds and farm machinery to occupied countries. The task of giving a minimum of aid in the rebuilding of bridges, roads, sanitation systems and water works has been left to the Army. The reconstruction groups are not giving the problem of getting peace production started in countries to be occupied by the United Nations, it is alleged, at least there are no plans to use steel made in this country.

MARKET predictions for steel sales after the war made by industry executives here run in this wise: Domestic sales will be good for two or three years—satisfying consumer demand thwarted by the devotion of war factories to military production. One prominent automobile manufacturer is quoted as saying that there is a backlog of orders for 12,000,000 cars.

Conservatively, it is possible that 20,000,000 to 30,000,000 ingot tons of steel will be looking for a market as soon as hostilities cease. This assumption is based on reasoning that peacetime demand after the war will follow trends established before the war.

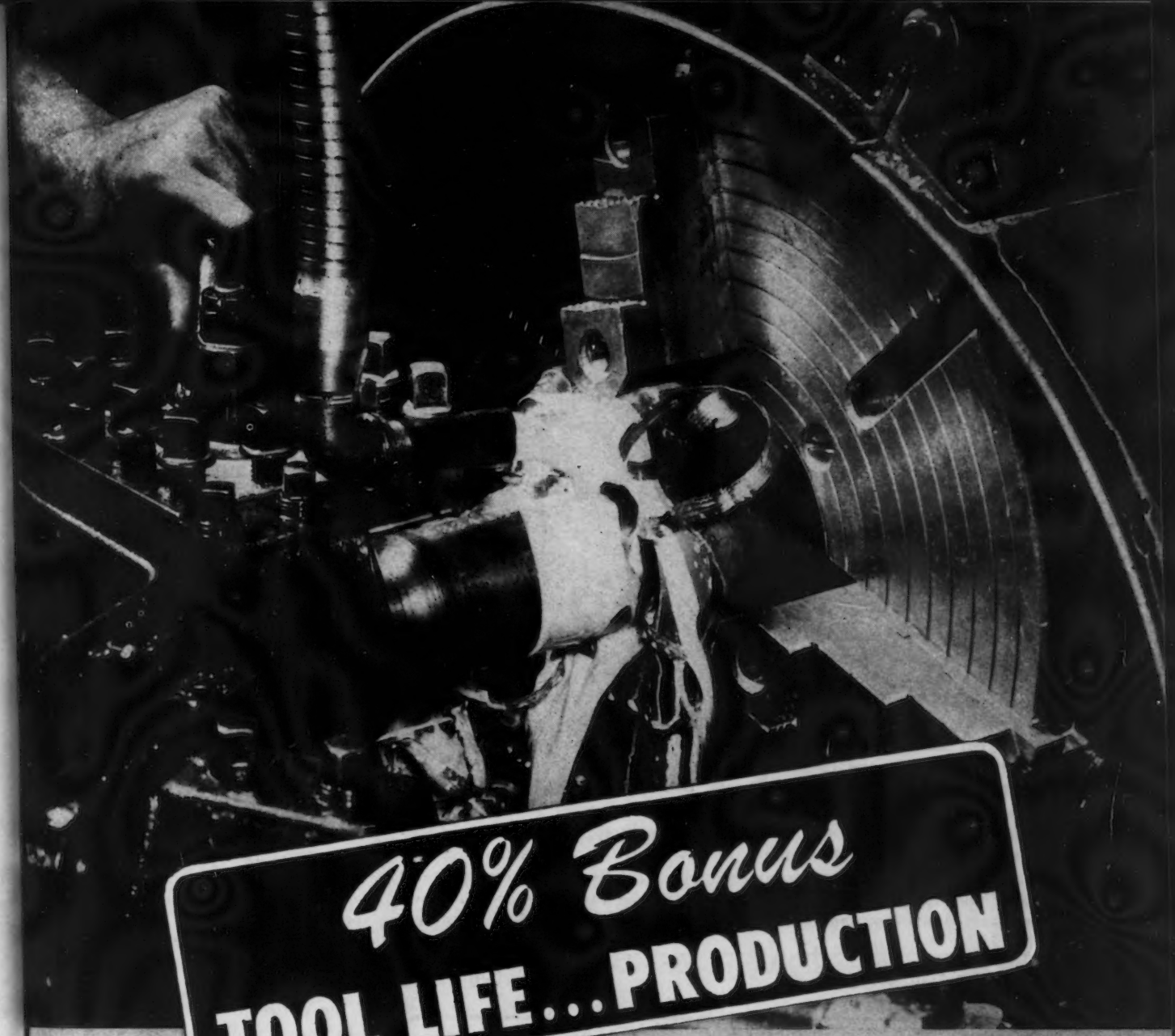
WHILE emphasizing that future domestic sales are going to be relied upon by the steel industry for the major part of post-war business, there appears considerable interest in export sales. Marketing men are looking toward South America, the East and Europe as possible new consumers. But the same old bugaboo of high American prices forced by our standard of living and labor costs stands in the way of of this now.

The obvious answer to the minds of many government men is the federal subsidy of foreign steel sales. Curiously, in trade circles here, there is some sentiment in favor of these subsidies on steel export. Those opposing the plan think that its adherents should have no further quarrel with government regimentation or get exercised over government control of private enterprise.

Suggestion has been made that there be organized a government-industry set-up similar to the British Iron and Steel Federation to deal with exports. Presumably, such an organization would be partly supported by industry and partly by government funds. Furthermore, it has been urged that the steel industry cooperate with the British in the formation of cartels to control post-war steel markets in Europe and South America.

Arguments against the plan are hot. Opponents of the plan say that once government gets hold of some measure of peace-time steel control, it will never be relinquished. It is claimed that it will be possible for raw steel to be manufactured into metal goods abroad and imported into this country at ruinous prices for domestic steel consumers.

Also, if the steel industry gets subsidies, the move will generate ambitions on the part of other metals industries to do the same thing, it is contended. Manufacturers of finished consumer products will not be far behind seeking like treatment. The



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From metal working plants large and small on America's production front reports such as these are constantly being received. Facts that prove why the majority of metal working plants flood their tools and work with Sunoco to get more pieces between tool grinds, reduce rejects, and make every man-hour and machine-hour result in peak production. Call in a Sun Doctor of Industry, let him prove the production value of switching to Sunoco in your own plant. Write

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result will be a tremendous peacetime invasion of business by government, and also will cost the United States taxpayer a pretty penny. The compensating advantage which will be used to cozen the average citizen into approving this intriguing scheme which is described as "hair-brained," is that it will insure post-war employment.

o o o

Government-Financed War Plants Now Four-Fifths Complete; Steel 75% Finished

Washington

• • • **The nation's** gigantic government-financed war facilities program was more than four-fifths completed at the year's midpoint, Chairman Donald M. Nelson reported Aug. 6.

At the end of June, the completion of $12,038,000,000 out of a current $14,582,000,000 Government-financed war facilities program had been accomplished, Mr. Nelson said. That compares with 61 per cent at the beginning of the year and only 34 per cent a year ago.

The midyear mark saw the greatest accomplishment in the construction of plants to produce finished munitions such as guns, combat vehicles, aircraft, ships and ammunition. Facilities for production of ammunition and explosives were 95 per cent completed. The iron and steel expansion was over 75 per cent complete.

The construction and equipment of plants to produce raw materials, such as synthetic rubber and steel, was fast catching up after earlier tendencies to lag. The extent of the advance which has been gained in this category this year is illustrated by the synthetic rubber program. Only 3 per cent finished a year ago, the synthetic rubber facilities program was 15 per cent in place at the beginning of 1943, and had risen to 61 per cent by the end of June.

It is only since the beginning of this year that raw materials facilities passed the half-way mark, Mr. Nelson pointed out. For example, while only 15 per cent of the federally financed synthetic rubber program was in place on Jan. 1, construction and equipment deliveries moved rapidly ahead to the favorable position they occupied at the end of June after receiving preferential treatment for components.

The largest percentage gain of the first half was registered for plants to produce 100-octane gasoline. At the beginning of the year, less than 1 per cent of the Government-financed the program was about 39 per cent program was in place, but by July 1 complete.

An encouraging picture is reflected in the iron and steel program, which is now more than 75 per cent in place. Seven of the plants that are the furthest advanced are being rushed to completion this year, and these alone will make up about one-third of the entire program.

In the field of chemistry, the rate of expansion has been extremely favorable. Only 31 per cent complete a year ago, the chemical program is more than 90 per cent completed.

An analysis of the Government's war facilities program this year clearly indicates that the end of the munitions facilities program is the beginning of the end of the raw materials program. Of the facilities completed in 1942, the largest proportion —70 per cent—went into ordnance, aircraft, and shipway facilities, while only 21 per cent went into raw materials. This year, on the other hand, 40 per cent of the facilities scheduled for completion is destined for raw materials and 50 per cent for end munitions.

Rep. Wright Patman, chairman of the House Small Business Committee, called for a statement of policy from the War and Navy Departments and the Maritime Commission on the matter of reports that the post-war period may be marked by "bargain sales" of Government-owned war plants to big companies now operating them.

War Dept. Cancels $60 Million Tank Job

Washington

• • • According to Brig. Gen. Albert Browning, the War Department has cancelled 5000 contracts, but has completed settlement of 3700 of these. The remainder are expected to be cleared up within 60 days.

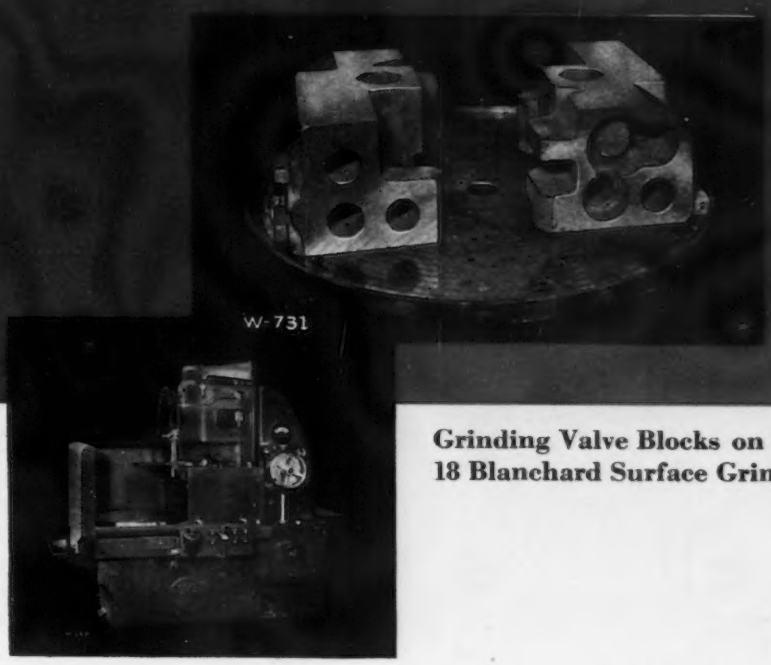
One of the largest contract terminations recently was the cancelling of a $60,000,000 order for tanks. The name of the company, the number of tanks, and reasons for cancellation were withheld, but it was revealed that nearly 5000 sub-contracts were involved.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



"PUT IT ON THE BLANCHARD"

CHECK THESE ADVANTAGES OF BLANCHARD GRINDING



Grinding Valve Blocks on a No. 18 Blanchard Surface Grinder

Production

★ **Adaptability**

Fixture Saving

★ **Operation Saving**

Material Saving

Fine Finish

★ **Flatness**

Close Limits

★ . . . . . *Especially valuable on jobs like the one illustrated.*

These cast iron valve blocks are finish ground from rough castings on the Blanchard surface grinder.

3/16″ of stock is removed from two sides of these valve blocks to limits of ±.005″. 4 pieces (8 surfaces) are produced per hour.

The close tolerances required between centers of bored holes and sides of block are easier to maintain because of the flat and parallel surfaces produced by Blanchard Grinding. Subsequent operations are always more accurate and made easier when the first operation is performed on a Blanchard.

BLANCHARD

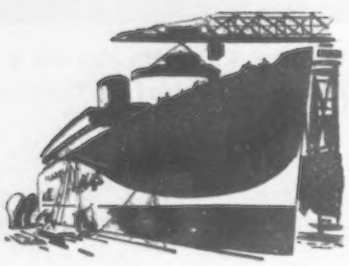
Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



The BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS., U. S. A.

WEST COAST . . . OSGOOD MURDOCK

• Lag in completing Coast steel foundry capacity hinders ship construction program . . . Civil Aeronautics Board expounds plan to dispose of postwar surplus aircraft . . . Government plans Coast steel price investigation.



LOS ANGELES—Enlargements in West Coast steel foundry capacity, designed to bring production to more than three times prewar levels, are losing ground in the home stretch.

Moderate additions have been made to steel foundry capacity in southern California, most expansion tonnagewise being slated for northern California, and, from a percentage standpoint, in the Pacific Northwest.

The biggest single chunk of new capacity consists of a Defense Plant Corp. foundry at Pittsburg, Cal., in the San Francisco Bay industrial area. This foundry is adjacent to the Columbia Steel Co. mill and foundry there will be operated by Columbia. Originally this foundry, whose capacity is rated at 30,000 tons annually, was slated for completion early this year. Postponements have followed one another elephant fashion down through the months, first because of delayed delivery of electrical equipment, later because of cranes. It now appears that all difficulties have been surmounted, and production within 30 days is a probability. From the standpoint of far western steel capacity, delay at this foundry has been serious, for some of the mechanical facilities at Columbia's DPC-sponsored Geneva works at Provo, Utah, are dependent upon ability of the Pittsburg plant to make deliveries, so that delays at Pittsburg will be reflected directly at Geneva. Moreover, Maritime Commission schedules for new type mass production cargo vessels have been closely keyed to Pittsburg. More complicated design of stern post castings for these new type vessels as compared to the Liberty models are dependent upon Pittsburg production, so that this type of vessel will not be produced on the Coast until this new foundry gets under way.

Comparable difficulties have been experienced by the Navy, which sponsored a somewhat smaller complete steel foundry unit for General Metals Corp. at Oakland. This foundry, too, was scheduled for production early this year, but is only now finally getting into production. Labor shortage has been no less a handicap in getting the new foundry into operation than shortage of materials in getting it constructed. When, and if, full production is achieved, General Metals alone will be able to turn out a larger cast steel tonnage than all Coast steel foundries before the war.

NO less important in slowing production of vessels has been failure to complete forge shop capacity in the San Francisco Bay region. Again, the difficulty has been failure to secure delivery of cranes. Cranes, incidentally, have been one of the principal delaying factors in completion of the Fontana mill of Kaiser Co., Inc.

As outlined in this column last week, additional foundry and forge shop facilities in the Pacific Northwest have materially increased capacities in that area. Delivery delays there, only somewhat less, impeded completion and operation.

Besides the major installations at principal industrial areas, new capacity has been added at smaller California cities such as Sacramento, Fresno, and Bakersfield. At the latter point a complete new foundry has been constructed.

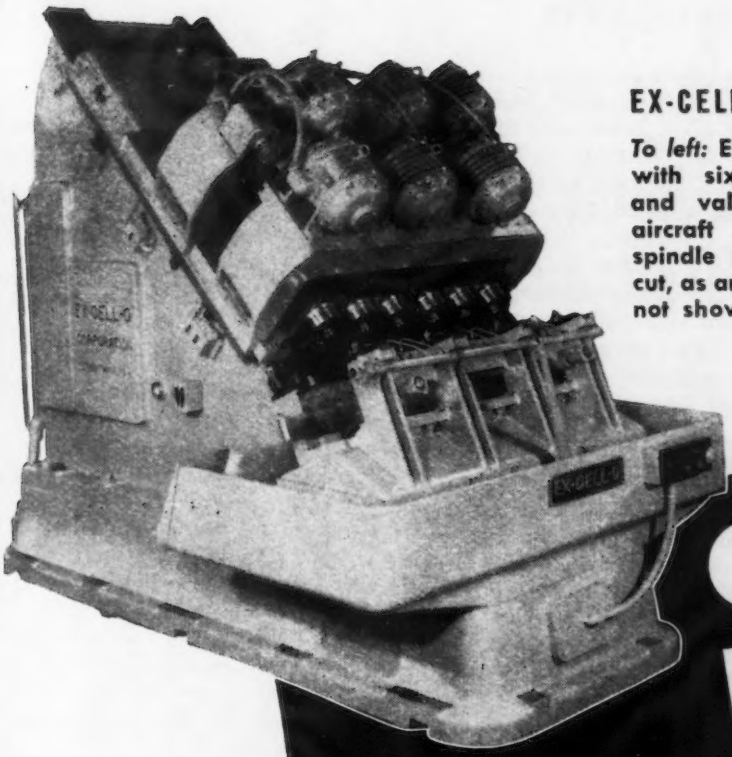
Scrap requirements of this additional Coast capacity appear so far to be well taken care of, but difficulties have been and will be encountered in securing such materials as molding sand. No Coast deposits have been developed of a grade comparable to the Illinois sand and Coast foundries for years have been dependent upon Belgium imports. Less rigid wartime specifications as to silica content and grain fineness distribution have made possible the meeting of most California needs from deposits within the state and from southern Nevada. Delays in expansion of northern California sand plant facilities for a time created a tight supply situation, but this difficulty appears to have been remedied. In the Pacific Northwest, no local sand has won wide acceptance by the steel foundries, and it has and will be necessary to make vastly increased imports from Illinois and Wisconsin. Southern California steel foundries, with less increase in capacity undertaken, have continued to meet their sand requirements using both local and Midwestern sands with little change in purchasing habit.

WORRIES of aircraft manufacturers that increasing emphasis upon military transport aircraft production may foreshadow a dumping of such models at prices far below cost in the immediate postwar period have been somewhat allayed by L. Welch Pogue, chairman of the Civil Aeronautics Board, speaking before the Los Angeles Aviation Forum.

Pointing out that disposal of transport aircraft now owned by the government without regard to consequences might mean glutting of the transport aircraft market for years to come and consequently aircraft manufacture and development, Pogue advocated formation of a special government corporation to dispose of all surplus military aircraft when peace arrives. He suggested that all activities of this government corporation be placed under the direction of a board of directors composed of representatives of the War Department, Navy Department, the State Department, the Treasury Department, the Commerce Department and the Civil Aeronautics Board.

Aside from its effect upon aircraft manufacture, it was pointed out that failure to inject new models into the aircraft transportation stream would mean that progress would be arrested for almost a decade.

"Being a nation of outstanding excellence in the field of transport aircraft manufacture," he said, "we will be overlooking an important consideration if we do not weigh carefully how our own interests dovetail with those of foreign countries, and make the necessary adjustments. Our own



EX-CELL-O CYLINDER BORING MACHINE

To left: **Ex-Cell-O angular type machine equipped with six spindles to finish bore valve seats and valve guide holes in cylinder head of aircraft engine on a production basis. Each spindle is individually adjustable for depth of cut, as are the tools in the boring bars (boring bars, not shown in picture, are piloted in the fixture).**

SPECIAL MACHINES

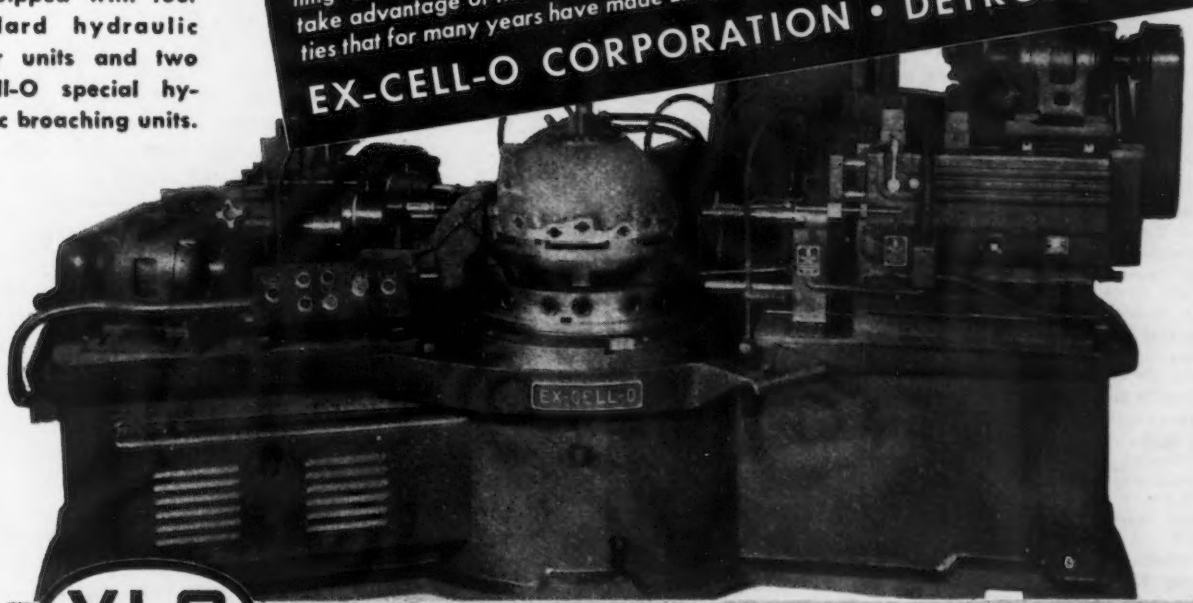
. . . for today's production . . . and tomorrow's

For years Ex-Cell-O has been familiarly known as "the headquarters" for special single-purpose machines for turning out accurate parts at a high rate of speed . . . machines that frequently perform numerous operations in one setting of the work and often bring not only a substantial increase in the number of parts produced hourly but also improved quality and reduced unit cost. . . . This is why so many manufacturers have turned to Ex-Cell-O for equipment to meet their war production schedules; why Ex-Cell-O designed machines will figure in the postwar plans of an increasing number of American industries. . . . If you are planning for tomorrow, when the new standards will necessitate costs that are competitive, take advantage of the wide engineering experience and extensive manufacturing facilities that for many years have made Ex-Cell-O a leader in the precision machine tool field.

EX-CELL-O CORPORATION • DETROIT, MICH.

EX-CELL-O SIX-WAY MACHINE

Below: **Ex-Cell-O six-way machine for drilling, broaching and reaming valve guide holes in a magnesium crankcase. This machine is equipped with four standard hydraulic power units and two Ex-Cell-O special hydraulic broaching units.**



XLO

EX-CELL-O *for* PRECISION

Precision **THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT PURE-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS**

good reputation as the vendors of efficient aircraft might be protected better by some kind of a program which would make our surplus aircraft available to meet temporary requirements, pending the time when more efficient aircraft become available for purchase. This would keep the market fresh and vigorous."

Pogue said Congress has moved toward a solution of the problem in proposed legislation giving the Civil Aeronautics Board authority to dispose of surplus military aircraft. However, he warned, there are too many interests involved to delegate full authority to the Board. He said that the Board, as a body, endorsed the idea of a government corporation composed of representatives of the Federal departments mentioned above.

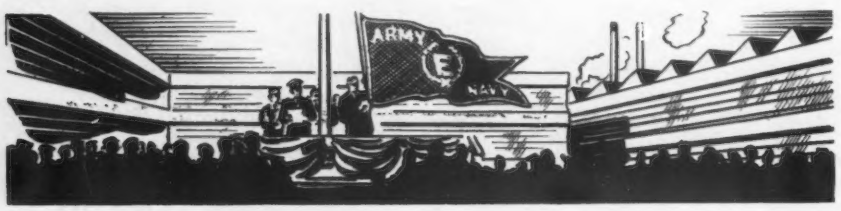
REVERSING a long time government policy discouraging postwar planning by aircraft manufacturers, Pogue advocated resumption of research and development work as soon as possible with a view to having new transport models ready for peacetime markets. Heretofore, constant pressure has been placed upon manufacturers to devote all their energies to immediate military production, with not even research talent devoted to postwar problems. The CAB chairman went further to advocate that planning should provide for aggressive practical application just as soon as the war program permits, rather than continuance of present models for as long a period as possible.

"To find time and find a way to launch and develop those activities, which at the war's end will place our aircraft factories in a degree of readiness to produce what they *should* then be capable of producing, is a matter of distinct national concern. To find time to develop new and better models of transport aircraft, ranging from small but efficient types suitable for local services to large trans-oceanic air liners, is the problem. I have faith that, if this problem can be worked out in harmony with the requirements of war production, our American manufacturers and airline operators need have little concern for the competition from postwar surpluses of war transport aircraft."

General concern among the aircraft industry here has not been so much over design and engineering problems involved in producing new models immediately after the war, but in securing a financial understanding with the government which would enable such a postwar program to be put into effect. Not too well heeled at the outset of the war expansion program, the present tremendous production has depended heavily upon government sponsorship for working capital. Anticipated withdrawal of such backing once peace is accomplished would impose upon the companies a dual problem of retooling and securing working capital upon a manufacturing structure inevitably suffering from severe shock. This problem has been freely discussed at all renegotiation meetings, as well as forming a prime factor in discussion of the effect of present taxation policy. So far, the government has been hesitant in agreeing to underwrite a program of the type which the CAB chairman discusses, even though it may be vital to future American supremacy in both aircraft manufacture and air transportation.

EVEN though wartime steel prices on the West Coast are controlled by the Office of Price Administration, the United States attorney general this Fall will investigate the Coast's steel price structure. This confirmation that the government still clings to a habit of periodical "investigations" comes from Tom C. Clark, assistant United States attorney general in charge of war frauds and antitrust prosecutions, who was on this Coast a fortnight ago. Reporters quoted Clark as stating that even steel rolled in local mills was priced on a Pittsburgh price plus rail and water rate. This charge goes even farther than the usual statement by local purchasers that steel produced in local mills does not reflect local production costs.

Most Coast purchasers are not so much concerned as to the effect of Federal action upon the post-war steel price structure here, as upon the competitive standard which will be set by the Kaiser plant at Fontana. Kaiser has made no secret of his desire to expand his range of products so as to balance his output more nearly with local requirements as to types of products.



. . . Cited for Awards . . .

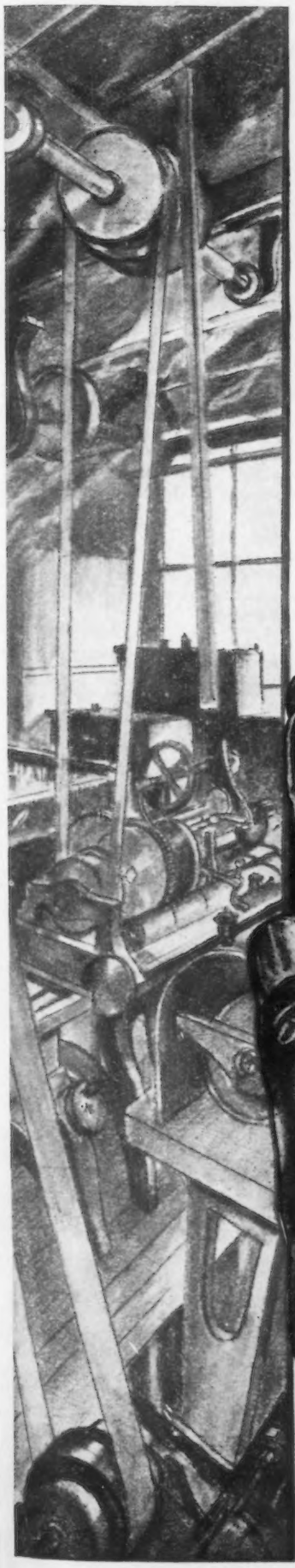
• • • **The following companies** have been awarded the Army-Navy "E" for outstanding performance in war production.

Waukesha Foundry Co., divisions at Waukesha and Watertown, Wis.
Hammond Iron Works, Warren, Pa.
Atlas Imperial Diesel Engine Co., Mattoon Plant, Mattoon, Ill.
W. A. Baum Co., Inc., New York.
Belle City Malleable Iron Co., Racine, Wis.
Buckeye Cotton Oil Co., Chemical Pulp Division, Memphis Plant, Tenn.
Chicago Wheel & Mfg. Co., Chicago.
Copperweld Steel Co., Glassport Plant, Pa.
Ford Motor Co., Tank & Motor Vehicle Depot, Richmond, Cal.
International Minerals & Chemical Corp., Potash Plant, Carlsbad, N. M.
Jarecki Machine & Tool Co., Grand Rapids, Mich.
McCormick & Co., Inc., Baltimore Plant, Md.
Murphy Elevator Co., Louisville.
National Standard Co., Wire Works Division, Worcester, Mass.
New Idria Quicksilver Mining Co., New Idria Mine, Idria, Cal.
Newark Stove Co., Newark, Ohio.
Trackson Co., Milwaukee.
Union Bleachery, Greenville, S. C.
John R. Wald Co., Milton Plant, Milton, Pa.
West Michigan Steel Foundry Co., Foundry Division, Muskegon, Mich.

Maritime Commission "M"

American Chain & Cable Co., Inc., Steel Castings Division, Reading, Pa.
Martin-Parry Corp., York, Pa.
Westinghouse Electric & Mfg. Co., Merchant Marine Division, Philadelphia.
Buckler-Chapman Co., Portland, Ore.
Gunderson Brothers, Portland, Ore.
E. H. Scott Radio Laboratories, Inc., Chicago.
Lake Shore Engineering Co., Iron Mountain, Mich.
R. D. Cole Mfg. Co., Newnan, Ga.
W-K-M Co., Inc., Houston, Texas.
Lionel Electric Trains, Lionel Corp., New York.
American Locomotive Co., Dunkirk, New York (gold star).
Cooper-Bessemer Corp., Mt. Vernon, Ohio (gold star).
Davis Engineering Corp., Elizabeth, New Jersey (gold star).
Federal Telephone & Radio Corp., New York (gold star).
M. W. Kellogg Co., Jersey City, New Jersey (gold star).
National Supply Co., Springfield, Ohio (gold star).
Production Engineering Co., Berkeley, Cal. (gold star).
Tube Turns, Inc., Louisville (gold star).
Young Iron Works, Seattle (gold star).

PUSHING ASIDE OLD METHODS WITH INDUSTRY'S NEW RIGHT HAND

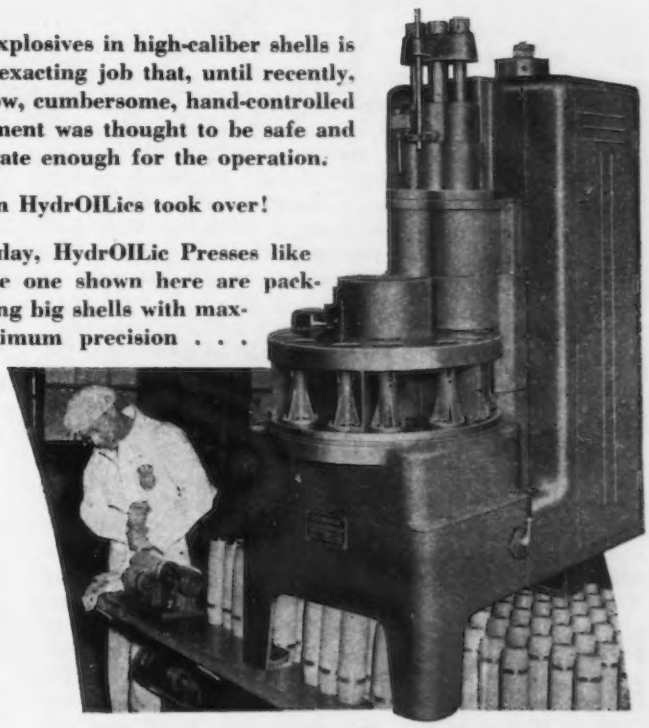


Shell Loading—A Ticklish Job Done Better And Faster!

Packing explosives in high-caliber shells is such an exacting job that, until recently, only slow, cumbersome, hand-controlled equipment was thought to be safe and accurate enough for the operation.

Then HydrOILics took over!

Today, HydrOILic Presses like the one shown here are packing big shells with maximum precision . . .



turning them out at a hitherto unheard-of speed . . . and with safety for the operator.

Shell-loading is just one of hundreds of jobs . . . in almost every industry . . . that are being speeded up, made safer, more accurate and more economical . . . by means of HydrOILic equipment or controls. *Applying* the smooth, flexible accuracy of oil hydraulic operation to Industry's production equipment is the specialized skill of Denison Engineers. That's why HydrOILics has become Industry's New Right Hand! Chances are, HydrOILics can give you a better answer to several production problems. Of course, we have a day-and-night war job to do, but our engineers can give you some sound ammunition for tomorrow's problems. Write today, or call your Denison representative.

The DENISON ENGINEERING CO.
1158 DUBLIN ROAD COLUMBUS, OHIO



DENISON EQUIPMENT in APPLIED Hydr ics

Fatigue Cracks . . .

BY A. H. DIX

Shape of Things to Come

• • • We are patiently trying to piece together the jigsaw puzzle that will reveal the postwar picture. The expert lookers ahead are not furnishing complete diagrams, so we have to fit in a piece here and a piece there as we go along.

Some of the key pieces are still missing, and one whole section of the picture is still a mystery to us. It has to do with deferred buying power. We have read in a lot of places that the accumulation of war bonds will provide the wherewithal to finance the tremendous built-up need for automobiles, washing machines, electric refrigerators, and so on.

The part that is over our head is this: if a nation could pay the cost of the war on a pay-as-you-go basis it would have no war bonds. While no modern nation has ever tried such a Spartan fiscal policy, both England and Canada are doing a proportionately better job than we are in paying the cost of the war out of current income. Our financing policy has more of the manana in it. Bonds are I. O. U.'s to be paid from future income. If war bonds were genuinely deferred buyer power then it would obviously be ill-advised for any nation to attempt to pay any part of the cost of the war while the war was in progress. For the less it paid in cash the more deferred buying power it would have to oil the transition to a peacetime economy.

This, of course, does not make sense. Government obligations have to be made good with postwar taxes, and it seems to us that war bonds can be viewed as a credit item on the postwar ledger only after taking a few deep drags on the kind of cigarettes that got Gene Krupa in trouble. We would like to see this point given more than a once-over-lightly in discussions of postwar planning. The most sensible treatment we have seen of it so far appeared in our longheaded Detroit editor's "Assembly Line" of July 15, page 82.

We will give a little thought to it ourself over the weekend and will promise you soon a plan for carrying the 300 billion dollar or so postwar national debt without even breathing heavily.

Man or Vegetable

• • • Under the title of "In the Good Old Summertime" Henry C. Boynton, of Trenton, N. J., has rewritten the poem entitled "Aestivation" that C. L. (Consolidated Vultee) Hibert dug up in an 1858 issue of the *Atlantic Monthly*. Mr. Boynton discovered that the poem was written by Oliver Wendell Holmes. He also found that *foles* means foals (colts), that *curr* means "to run," and that *wipes* is "weeps." The only thing he is doubtful about is "cive." It may be an obsolete spelling of *chive* or may be short for "civilian." Take your choice.

But "cive" is definitely "man," according to Sherwood Cummings, of Rockford, Ill., who submits an interpretation entitled "Spring Fever Hangover." In our biased eyes, Mr. Cummings' work equals the best parts of our favorite poem, Gray's "Elegy in a Churchyard." Listen to the first two verses:

In white hot anger burns the sun on high;
The leaves hang motionless from branches dry;
The panting fellow wipes his forehead dank,
And yearns to tramp a windy river bank.

How sweet to dwell from human sight concealed,
To sleep unnoticed on a grassy field.
Pick the sweet berries from the bending vine,
And drink the milk that flows from long-tailed kine!

The rhymed translations are being sent to Mr. Hibert, as proof that the combined knowledge of this page's loyal army of eighteen readers is awe-inspiring.

He Hates It

• • • Our friend, Bill (Armco) McFee, froths at the mouth at the use of "ad" for "advertisement." As this isn't one of the things we care much about one way or the other, we are neither sorry nor glad to report that "ad" is gaining rapidly. Chester J. LaRoche, chairman of the War Advertising Council and one of the ad business' full generals, used it the other day in a nationwide broadcast, "Our goal is . . . a war message in every ad."

The adv. journals themselves use it, and with the paper situation getting worse the 13-letter full dress will probably be worn less and less.

What annoys us is the term "write-up."

Choler Raiser

• • • Another term that we have come to dislike is "red-blooded." We have seen it used to justify lynching, black market buying, race prejudice, wife beating, and other of the more unpleasant departures from the golden rule. As it has been cursed with disagreeable associations we always skip any sentence in which it appears, so as not to upset ourself in these humid days.

Cerebral Correction

You wrote recently that the cerebellum was responsible for a typesetter putting down "stop" instead of "shop." Now, the cerebellum is concerned in the coordination of movements and a stop is no movement.

—I. Maddaus

All along we have had a vague idea that the conscious mind resided in the cerebrum and that subconscious thoughts raced around the cerebellum like fourth graders on a day at the zoo. But this is probably an outmoded conception and we are glad to be brought up to date, but not too glad, as Mr. Maddaus gums up our theory that suppressed desires fermenting in the cerebellum cause typographical errors. In the case of "stop" for "shop" we had it all figured out that the lino operator had been out the night before with the widow he is courting. "Stop" was in his subconscious mind and he sought the readiest outlet, even though it meant twisting "shop" into "stop."

As our theories are slowly and painfully conceived, we never part with them without a struggle. To salvage this one all we have to do is to move the subconscious into the cerebrum and let it live there along with the conscious mind. That concession is easy to make and it is hereby made.

Animal Husbandry Dept.

• • • To you, to ewe is to have a lamb. To me, ewe is not a verb but a female sheep. To have a lamb is to lamb.

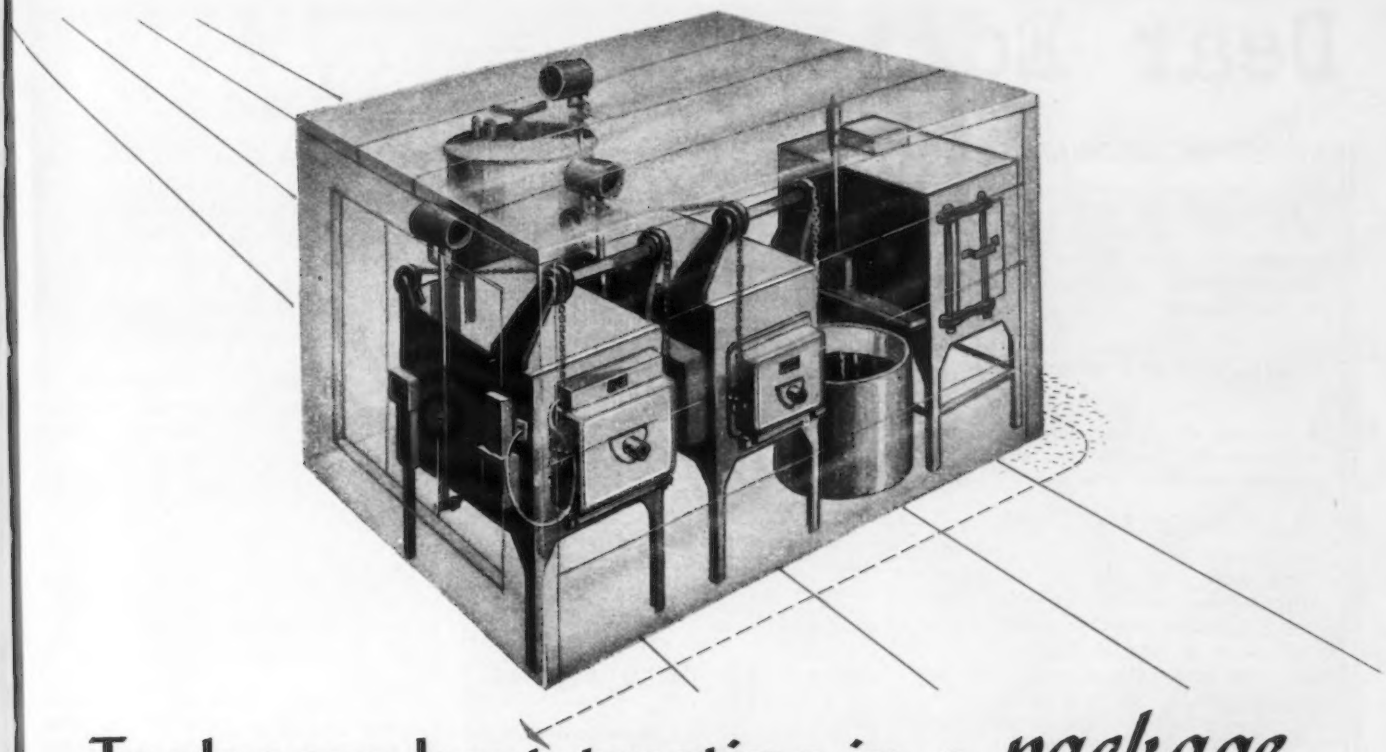
W. S. Miles,
Virginia Bridge Co.

To Webster, *ewe* is a female sheep, a noun and a verb. *Ewe, v.t., to give birth to a lamb.*

Puzzles

• • • Mrs. Roy Hill, of Brooklyn, says the following is Mr. Hill's pet problem. We have seen it done with apples, potatoes, cocoanuts, and cumquats, but never with pieces of eight, so here goes:

Four pirates located a buried treasure of pieces of eight, just at twilight, and decided to wait until daylight to divide it. To make sure of getting his portion, No. 1 pirate got up in the night, counted the treasure into four equal piles, and having one piece left over, threw it into the lagoon. He took one pile, and mixed the three others together. Later the second pirate got up, divided the remaining treasure into four equal parts, threw the one piece left over into the lagoon kept one pile, and replaced the others. The third and fourth pirates each did likewise. In the morning, the remaining treasure was divided into four equal piles, and there was one piece left over. How many pieces were there originally?



Toolroom heat treating in a *package*

. . . a preheat furnace, a high speed furnace and a tempering furnace, plus complete quenching equipment can be supplied in its entirety by Lindberg for the precision heat treatment of your finest tools and dies.

1. The preheat and high speed hardening furnaces employ the Lindberg Hydryzing process for hardening *all* tool steels. Hydryzing is economical because it saves you the expense of costly cleaning operations such as sandblasting, polishing, stoning, etc. Its neutral atmosphere protects all tool steels from scale, decarb and carburization with the consequent assurance of long productive tool life.

2. The famous Lindberg principle of tempering solely with recirculated air, plus the precision and uniformity of heating are a few of the reasons why the Lindberg Cyclone Tempering Furnace is the most widely used tempering unit in the field today. The result of the Cyclone's close heating control and uniformity is perfect tempering to specifications with the desired toughness for maximum tool life.

3. With full toolroom setups, Lindberg can supply pot furnaces and complete equipment to meet any quenching requirements.

Learn how you can have all the advantages of clean, full hardening and accurate, low-cost tempering. Write TODAY for Bulletins 94 and 62.



A typical tool for Hydryzing is this bell shaped cutter, which is made of Moly High Speed Steel. It is 2 17/32" long through the bore, has a 5" outside diameter and weighs 8¼ lbs.

It was preheated in a Hydryzing Furnace at 1500°F., for 48 minutes, then placed in the high speed furnace for 12 minutes at 2225°F. It was quenched from 2225°F., into an 800°F., lead bath to avoid cracking at the sharp recesses of the teeth. From the lead bath it was allowed to cool to 150°—180°F.

In a Cyclone Toolroom Tempering Furnace, the cutter was hected for 2 hours at 1025°F., removed and allowed to cool to room temperature. Hardness was 65-67 Rockwell "C".

LINDBERG FURNACES

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ARMY E NAVY

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

Dear Editor:

SWISS TYPE AUTOMATICS

Sir:

I am interested in obtaining a reprint of your article, "Production of Slender Parts on Swiss Type Automatics," which appeared in your Jan. 28, 1943 issue.

P. W. KOCH,
Development Engineer
Manning, Maxwell & Moore, Inc.,
Elias Street,
Bridgeport, Conn.

● We have no reprints. However, George W. Garton Co., Racine, Wis., may be able to supply you with a copy.—Ed.

ENEMY PATENTS

Sir:

We have seen the list of patent applications seized by the Alien Property Custodian that is published in your issue of July 8. It seems to us that you have done a very good job of selecting the titles and classes in which your readers should be interested.

As a result of your publication, we have received a great many requests for information and copies of patents and applications referred to in your article.

Your summary of the recommendations of the National Patent Planning Commission is also noticed and it is thought that articles of this kind cannot receive too much publicity, and that some form of this summary should be contained in every industrial and general publication in the country.

HOWLAND H. SARGEANT,
Chief
Division of Patent Administration,
Alien Property Custodian,
Chicago 3, Ill.

MACHINE TOOL STATISTICS

Sir:

Would you be so kind as to refer me to some publication or organization giving production statistics on machine tools, from 1937 to date?

V. H. GOTTSCHALK,
Senior Physicist
U. S. Dept. of Interior,
Bureau of Mines,
College Park, Md.

● We suggest you get in touch with the National Machine Tool Builders' Assn., 10525 Carnegie Ave., Cleveland.—Ed.

FORGOTTEN PEOPLE

Sir:

Your editorial in the issue of July 15 is very appropriate; however, may I mention still another "Forgotten People."

During the depression years the very small business man, Professional, Industrialist, and Tradesman, Commodity dealer, and "What Have You" found himself forgotten, squeezed out, and maligned because his business was small, and therefore not of sufficient importance to obtain any help, and the attitude of Government, Big Business, Industry, Labor, etc., was to "Dry up and Bust."

When conditions in the latter 30's improved somewhat, there appeared some hope for him that he might be able to survive; with the breaking out of World War II, his hopes started to fade again. Then, when the United States itself became involved, he was promptly squelched if he attempted to muscle in anywhere. Until today, if he is still in business, he is fortunate if he can even exist. And, if he is past 45 and offers his experience and services to helping in the war effort, he is "laughed to scorn," as being too old, and is given the "grand old run around" by both Government and business alike.

W. R. CONARD
Burlington, N. J.

ATOMIC HYDROGEN WELDING

Sir:

My attention was recently drawn to your article, "Tool Conservation in the Navy," which appeared in the Aug. 27, 1942 issue. We are interested in your references to the Navy's use of atomic hydrogen welding methods in the salvage of broken high-speed steel tools.

Some time ago our Research Department experimented to some extent in the possible use of atomic hydrogen welding for this purpose. At this time, we met with little or no success. The prime difficulty is the decarburization of the tool steel in welding. However, it has come to mind that the Navy may have further information available regarding their procedures, which may be of value to us in our tool salvage program.

We would appreciate having any such information which you can pass along to us on these lines. We are primarily interested in procedures in preparation of the high-speed steel parts to be welded, actual welding procedures, and any subsequent treatments given the steel after welding.

W. A. BLAKEY,
Ordnance Div.
Chain Belt Co.,
Milwaukee, Wis.

● The Navy Dept. has not gone any further with atomic hydrogen welding of broken high-speed steel tools. You might communicate with Thomas Sutton, welding engineer, Welding Equipment & Supply Co., 223 Lieb St., Detroit, for information on what is called Suttonizing process for repairing high-speed steel tools by a special high speed-steel welding rod. The special rod used is supplied by the Gorham Tool Co., 14400 Woodrow Wilson Ave., Detroit, and it is suggested that you write them for their pamphlet describing the technique for retipping cutting tools and dies with Gorham high-speed welding metal.

Literature may also be obtained from the Eutectic Welding Alloys Co., 40 Worth St., New York, which has a line of Castolin eutectic low temperature alloys used for this purpose.—Ed.

SABOTEUR . . .

Sir:

Your editorial, "Saboteur Bombs 50 Liberty Ships," in the July 8 issue is excellent and deserves more publicity than you are able to give it. It is a sad state of affairs that 1600 Pennsylvania Ave., Washington, D. C. does not have enough intestinal fortitude to crash a good stout club on the heads of those disgraceful labor racketeers.

It is astonishing how disgusted the general public is becoming.

As a sign of the times, in the Pittsburgh district, the registration of voters is becoming strongly Republican and the newspapers are calling attention to this trend.

W. WALLACE BOYD,
Mechanical Engineer
Pittsburgh, Pa.

Sir:

We just want you to know how much we enjoy your courageous editorials. It would be a wonderful thing if they could be syndicated and read by everyone.

Your latest, "Saboteur Bombs 50 Liberty Ships," is right to the point. We may never know why more people cannot see how we are losing on the home front while our boys are fighting over-seas.

We simply must clean our house here at home and do it quickly. Your fine writing will do much to help. Keep it up!

EARL A. RILEY
Locke Stove Co.,
114 West 11th Street,
Kansas City, Mo.

PLASTER MOLDS

Sir:

We are interested in information covering the Capaco process. In your Oct. 9, 1941 issue is an article on pages 74 to 98 that we should like to have. If you cannot supply the magazine, can you clip from it the pages in which we are particulary interested?

HENRY J. SCHWEIM,
General Manager
Gypsum Assn.,
211 West Wacker Drive,
Chicago, Ill.

BRASS FORGINGS

Sir:

We are installing a foundry and would like information on brass forgings. I would like to know where this information, and also some on die castings, can be obtained.

JAMES W. NELSON
P.O. Box 128,
Suquamish, Wash.

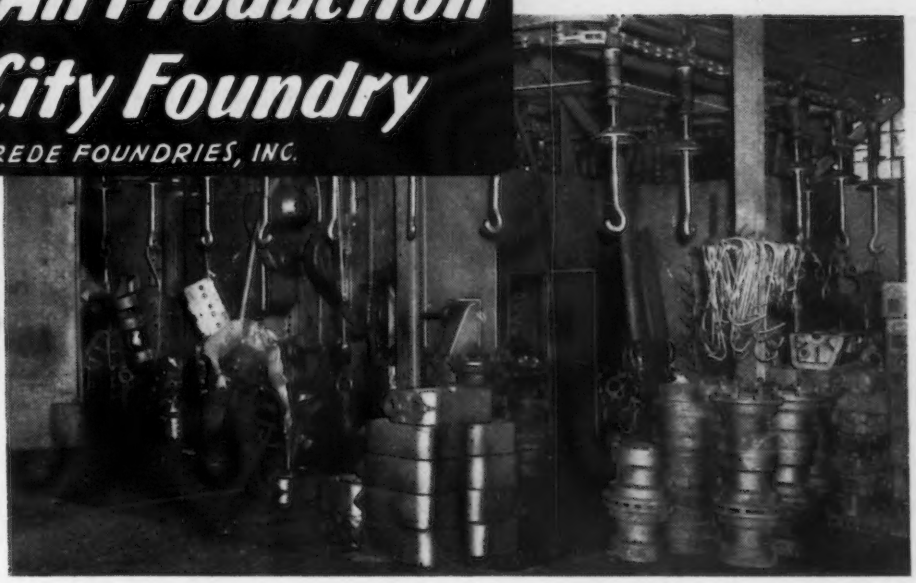
● We know of no specific information on brass forgings, but the Forging Handbook published by the American Society for Metals, Cleveland, contains information on steel forging practice that would be generally applicable to brass forging practice also.

For information on die castings, see Marx Stern's "Die Casting Practice" published by McGraw-Hill Book Co., 330 West 42nd St., New York, which sells for $2.50; and "Die Castings" by Herbert Chase, published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, which sells for $3.50.—Ed.

1 Wheelabrator Cabinet Cleans 95% of All Production at Spring City Foundry

DIVISION OF GREDE FOUNDRIES, INC.





MORE than 20,000 tons of gray iron, steel and alloy castings were produced in 1942 by Milwaukee Steel Foundry, Milwaukee; Spring City Foundry, Waukesha, Wis., and Liberty Foundry, Wauwatosa, Wis., operating as divisions of Grede Foundries, Inc. The majority of this tonnage was cleaned in Wheelabrator equipment with a decided improvement over former cleaning methods in speed, quality and cost.

Most of the larger castings, such as cylinder blocks, manifolds, hubs, etc., are produced at Spring City Foundry Division. The problem in cleaning this production was to obtain equipment that would handle a range of work varying widely as to size, shape and weight. Castings often weigh as much as 2,000 lbs., though a large part of the production consists of smaller pieces, some weighing as little as one lb.

MONORAIL CONVEYOR USED

After thorough investigation of the quality, size and weight of work to be cleaned, a Wheelabrator Special Cabinet with a heavy-duty monorail conveyor system was installed. Three Wheelabrator blast units 19½" in diameter x 2½" wide, each throwing 450 pounds of steel abrasive per minute are mounted on one side of the heavy steel plate cabinet. These Wheelabrator units are staggered as to height from the floor to give an abrasive blast coverage to all parts of the work and provide for cleaning a wide range of work sizes.

At the present time over 95% of the foundry's entire production of green castings is handled through the cabinet, with approximately half the total tonnage cleared through a second time to remove scale after the heat treating process.

CAPACITY: 4 to 6 TONS PER HOUR

Cleaning capacity of the high production cabinet ranges from four to six tons an hour, depending upon the work being handled. Since some of the castings produced are very small, special "Christmas tree" hooks were designed to handle them.

Work is staggered on the hooks, with very large pieces in one position and a group of smaller pieces on adjacent hooks.

REBOUNDING ABRASIVE IS PUT TO WORK

On entering the cabinet, the work traveling parallel to the blast wheels (but at the far side of the cabinet) is hit by abrasive that missed work directly in front of the wheels and by abrasive that rebounds from work at other positions in the Cabinet. The conveyor moves each hook one station at a time, and in normal operation, 40 hooks pass through the machine per hour, each with a maximum loading capacity of 2,000 pounds.

NO "TOUCH-UP" ROOM IS NECESSARY

In front of each of the three Wheelabrator blast units the casting-laden hook is stopped and rotated in the abrasive stream. Since the abrasive field of each wheel strikes the rotating casting at a different angle, all crevices and pockets of intricate castings are thoroughly cleaned. Because of this complete cleaning, which removes every trace of foundry sand or scale, it was unnecessary to provide a "touch up" room for manually cleaning these hard-to-get-at corners or pockets with an airblast nozzle.

Multi-pass of work before the three wheels is provided to permit the maximum cleaning action from the abrasive and at the same time to shield the walls of the cabinet from direct abrasive blast.

Foot Note: A new Wheelabrator is now on order for Grede Foundries, Inc., newly acquired Smith Steel Foundry Division.



AMERICAN FOUNDRY EQUIPMENT CO.

510 S. Byrkit St., Mishawaka, Ind.

World's Largest Builders of Airless Blast Equipment

This Industrial Week . . .

- **Manpower Shortage Now Biggest Problem**
- **Civilian Steel Allotment Escapes Slash**
- **Machine Tool Cutbacks Are Revealed**
- **Steel Drive Ends; Ingot Rate Steady**

THE shortage of manpower is out-distancing all other current war production problems. It is credited with being the chief reason why aircraft production in July, although at a new peak, fell 627 units below the month's quota, and it is the No. 1 problem facing the nation's railroads, steel plants, and other industries. (Model changes and cutbacks also are factors influencing war production to a great degree. In aircraft, blame also has been heaped upon the Truman Committee report.)

The aroused War Department points to the fact that 250,000 workers have passed through the Boeing airplane plant in Seattle since Pearl Harbor, whereas the net force is only 30,000 persons. Two ways of solving the aircraft labor problem are being studied —greater preferential treatment under Selective Service and wage incentives. There is also discussion with regard to concentrating production.

Suffering heavily from the draft, U. S. railroads are said to require the recruiting of 80,000 workers this year. Steel executives are perplexed at how they are going to increase production as manpower disappears. The newly installed 48-hr. week is by no means an answer. Steel men say there isn't a chance in the world of steel supplies loosening up for months to come and they see no hopes for the civilian economy getting more steel other than for repair parts.

Nevertheless, the civilian allotment of carbon steel for fourth quarter was increased as forecast in this magazine, while all other requests including those for export were reduced. Stated requirements of the Army, Navy, Aircraft Resources Control Office and Maritime Commission were slashed about 9 per cent. Total requests from the 16 claimant agencies for carbon steel amounted to slightly more than 19,500,000 tons against an estimated fourth quarter supply of a little under 15,500,000 tons. The overall reduction in allotments compared to requests is much less than was necessary in third quarter.

EXCEPT for "straggling tonnage," the inventory portion of the steel recovery drive has ended with cancellation of allotments for the third and fourth quarter of 1943 amounting to 868,837 tons. Steel Division officials have expressed gratification with the response of consumers. A final breakdown of recoveries in net tons reported from 11 large cities follows: Boston, 59,886; New York, 61,666; Philadelphia, 163,956; Atlanta, 38,492; Cleveland, 162,329; Chicago, 168,216; Dallas, 21,663; Kansas City, 22,753; San Francisco, 92,804; Detroit, 74,633. WPB issued a statement that the drive brought the steel recovered to over 1,000,000 tons. This is accounted for by the 868,837 tons reported as canceled by WPB agents plus 175,000 canceled direct through the claimant agencies.

The dispute over whether fast or slow merchant ships should be built is ended as far as the Maritime Commission, which favors the fast Victory model, is concerned. "We are going to build as many Victory ships as we can get turbines," Admiral Emory S. Land said this week. Over 400 Victory vessels, aggregating 4,365,000 tons have been awarded so far. Maritime may seek 24,000,000 tons of ocean-going shipping in 1944 although its publicly announced goal is only 21,000,000 tons. This year the commission may build an additional 2,000,000 tons over and above the 19,000,000 tons the President recently said would be built this year. Victory ships will take plates from continuous steel mills, same as present models, but will require about 10 per cent more steel per ship.

THE railroads are fighting for more equipment, particularly motive power, lack of which is resulting in more freight train delays, WPB expects that 900 locomotives will be put in service this year, but only 324 had been delivered on July 1. While 1,400,000 tons of steel has been allocated for transportation needs in fourth quarter of this year, barges and automotive equipment must be taken out of the figure in addition to railroad needs. ODT has earmarked 400,000 tons for rails in fourth quarter.

The volume of machine tool production in 1944 will drop to a level between $300,000,000 and $500,000,000 from production worth slightly under $1,000,000,000 this year because of cutbacks ordered by WPB, it was revealed at a meeting held on Aug. 3 by the Machine Tool Industry Advisory Committee. A press statement ostensibly covering what happened at the meeting was issued last Monday by WPB. The statement gave no indication of how much machine tool production has been cut nor what method is being used.

Seven-months' steel production at 51,242,929 net tons of ingots is an all-time record, about 1,562,000 tons more than in the corresponding part of 1942. It is now expected that production for the full year may wind up around the 90,000,000-ton mark, below the level optimistically predicted at the start of this year before the coal strikes and other troubles started, but still a phenomenal feat. Output in July was 7,376,017 tons, and about 230,000 tons ahead of July, 1942. Finished steel shipments by U. S. Steel Corp. subsidiaries were 1,660,762 net tons in July, against 1,552,663 tons in June and 1,765,749

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Sidelights of the Summary

● ● ● While not formally announced yet, the American Industries Salvage Committee ceased functioning as of Aug. 1 . . . How can American steel exports compete in the post-war era against low cost foreign production? This is disturbing some Washington authorities to the point where they are just about in favor of subsidies . . . It is said 20,000,000 to 30,000,000 ingot tons of American steel may be looking for a market as soon as hostilities cease . . . An explosion in an Eastern open hearth last week, on the heels of a blast in an Eastern scrap yard, brought an Army investigation concerning the possibility of live ammunition in battlefield scrap. There was no truth to the rumors, the Army said. Furthermore, steps are being shaped to prevent any possibility of such a danger . . . While the government in shifting coal to help maintain coke production, an Eastern firm is seeking to sell four cars per week of 72-hr. beehive coke, released by a steel company. The low price has made some prospective purchasers suspicious . . . A new all-time monthly high in downlake shipments of iron ore was established during July when 13,523,313 gross tons moved to U. S. ports and 65,501 tons moved to Canadian ports. Cumulative shipments to Aug. 1 were 38,382,704 gross tons, a drop of 8,974,968 tons from shipments to the same date last year when they totalled 47,357,672 gross tons . . . Because a steel foundry cannot get delivery on equipment, West Coast shipyards are facing the possibility of delay in making Victory ships and a steel company's operations are affected . . . Truck makers are agog over the possibility of large quantity production of trucks in 1944, including many heavy duty units. An unprecedented conversion job might be necessary.

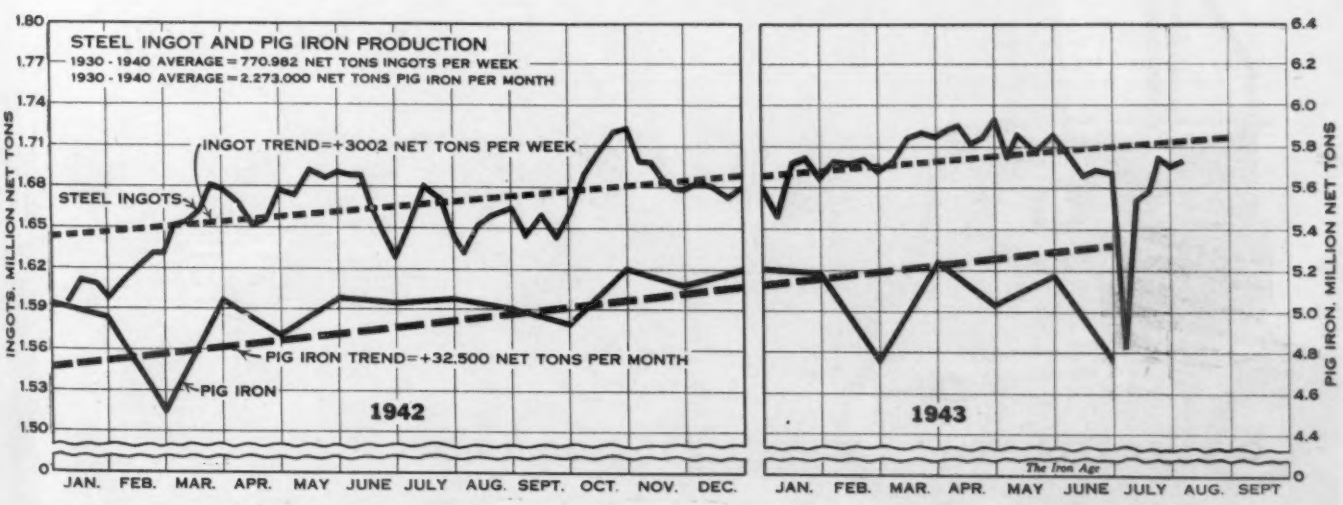
tons in July, 1942. For the year to date shipments total 11,700,778 net tons, against 12,269,256 in the same part of 1942.

HOT rolled sheets are reported to be reaching the point where they are as scarce as plates. A container program of large proportions has been held back by inability to fit it into sheet mill schedules. Maritime's additional 2,000,000 tons of ocean-going shipping for 1943 will result in the dislocation of about 70,000 tons of hot rolled sheets, Washington experts say. The reason is that Navy and Maritime demand will take up all but about 250,000 tons of plate making capacity monthly. The only way other consumers of plates can be assured of their required deliveries is by increasing the output of the continuous strip mills and the sheet mills. Sheared plate mills are operating at 100 per cent of capacity and while many continuous strip mills have been converted to plate making it is thought that more may be asked to convert to solve the problem.

The carbon steel bar supply situation remains very tight, while alloy bar delivery promises have improved recently. Orders coming to steel companies continue strong, with cancellations small, it is reported.

THE steel ingot rate this week remained at 98.5, with Pittsburgh up half a point to 102.5, Chicago up to 99 from 97.5, Wheeling up 2 points to 90, Detroit up 3½ to 102.5. Youngstown and Philadelphia were each down a point, Eastern was down 8 points from last week's revised 97, Southern Ohio River was down 9 points, Cleveland down 3½, Buffalo down 4½. The Western and St. Louis and Southern rates remained unchanged.

The Iron Age



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 5	102.0	97.5	98.0	94.0	100.0	104.5	88.0	98.5	99.0	102.0	107.0	99.0	97.0*	98.5
August 12	102.5	99.0	97.0	93.0	96.5	100.0	90.0	98.5	102.5	102.0	98.0	99.0	89.0	98.5

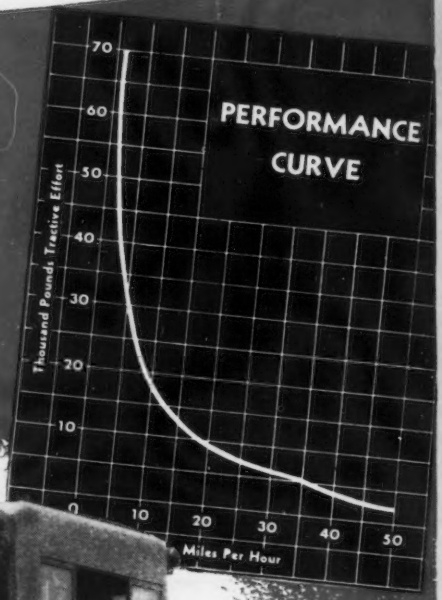
* Revised

100 TON PORTER

650 H.P. DIESEL ELECTRIC SWITCHER

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Built for heavy yard, terminal and belt-line work, this newest 100-ton 650 horse power PORTER is in every sense a railroad man's switcher. Powered by two complete Diesel-Electric Units, it is equal to the toughest switching job, yet is versatile enough to be used for light work. Its two independent power plants insure constant availability and unlimited operating range. Complete specifications on request.





ONLY **PORTER** BUILDS A **COMPLETE** LINE OF LOCOMOTIVES

PORTER Better Built Locomotives Established 1866

H. K. PORTER COMPANY, INC.
PITTSBURGH PENNSYLVANIA

Two Ways to Solve Manpower Problem in Aircraft Industry Studied As July Output Falls Below Quota; Railroads and Steel Industry Also Face Problem

NEWS OF INDUSTRY

Washington

• • • While the 7373 military planes produced in July established a new record, it was 627 below the quota, set for 8000. In weight the July output was 4 per cent over June. Nevertheless, the failure to meet the quota has so aroused the War Department that it has asked James F. Byrnes, director of the Office of War Mobilization to find a quick means of getting production up to the required level. The chief difficulty in achieving this goal is lack of manpower. To aid him in overcoming the problems of plane production, Mr. Byrnes has chosen Bernard M. Baruch, his special adviser.

The chief efforts of Mr. Byrnes and Mr. Baruch, it was stated, will be to keep in line the government agencies that are responsible for directing policies that will result in a stepped-up output of planes. The principal agencies are the War Manpower Commission, which provides labor, and the War Production Board, responsible for production. Since wages also figure in the picture it is considered likely that the WLB likewise will be fitted in the pattern to be set by Mr. Byrnes and Mr. Baruch. It was emphasized, however, that the turning of the problem over to the Office of War Mobilization does not mean that the other government agencies are being by-passed. On the contrary, it was explained, they will continue to function in the roles to which they are assigned.

In their joint statement on July plane production, WPB Chairman Donald M. Nelson and WPB Vice-Chairman Charles E. Wilson said that not only was the production in that month an overall record but that the number of heavy bombers produced, also a record, was 13 per cent above June output. However, concern of the War Department was shown over the drop in July of 30 Flying Fortresses produced in the Boeing plant in Seattle, Wash., where there has been a particularly large labor turnover. It was officially stated that 250,000 workers had passed through this plant since Pearl Harbor, whereas the net force is only 30,000. Shifting of labor to shipyards and other plants where wages are higher than they are in the aircraft industry is held to be largely responsible for this big labor turnover.

Mr. Baruch is said to have before him information showing that 58,000 additional workers each month for the next year will be needed in aircraft plants, if the output is to meet the levels set. Considering the big labor turnover, it is estimated that some 2,000,000 aircraft workers will have to be hired within a year.

Two specific methods of solving the manpower problem in the aircraft industry are being studied. One contemplates greater preferential treatment under Selective Service and the other proposes wage incentives for aircraft workers. In connection with preferential treatment it was said that the 60-day blanket draft deferment given West-Coast aircraft workers last week may be extended on a nation-wide basis, even though there is a question respecting the legality of such action. The wage incentive plan already has been applied to the Beech Plant in Wichita, Kan., and estimates have been made that if ap-



TRIAL FLIGHT: The Douglas C-54 cargo ship is shown here on a trial flight marking the dedication of the new Douglas Aircraft Co. plant at Chicago. It has a wing span of 117 ft. and a cruising range of about 5000 miles. Loaded, it can carry 15 tons.

FIRST CHICAGO BUILT SKYMASTER: This huge cargo plane is wheeled out for its initial flight at the Douglas Plant near Chicago, July 30.

Press Association, Inc.



plied generally it would result in 10 per cent increase in production.

There is also discussion with regard to concentrating production by types of planes as a means of increasing output. However, it is said to be recognized that pending the necessary conversion in many plants there would be a drop in output. The question therefore is whether the plan is practical in view of the pressing need for immediate increased production. Should concentration be decided upon it is said it would be applied to the B-17 Flying Fortress and the B-24 Liberator, both bombers, and the P-38 Lightning and P-51, fighter planes.

Less expensive and more efficient than wooden types, the Army has gone all-out for all-metal cargo planes. Its switch to this policy was announced last week when it canceled contracts for the manufacture of wooden cargo planes designated as the C-76. It has substituted the Curtiss Commando C-46 metal cargo plane in the plant of the Higgins Co., New Orleans, in the place of the C-76.

Cancellation of contracts for wooden planes is due to the great increase in aluminum production which the Army said should be sufficient to meet requirements for the all-metal type of plane.

It was pointed out that the metal cargo types, such as the Douglas C-47 and the C-54, and the Curtiss C-46 are highly successful and are now in volume production.

In addition to using the Higgins plant for building metal planes, the War Department said that arrangements are being made for the utilization of the facilities of the Curtiss-Wright Co., at Louisville, Ky., for production of other aircraft or parts. The WMC has been notified, the statement said, so that there may be immediate reemployment in other essential industries of any displaced workers.

WPB last Thursday set up machinery to provide essential civilian aircraft with sufficient supplies to keep them in proper repair and in operation. This action, contained in an amendment to Order P-47, permits the assignment of preference ratings and the allotment of controlled materials necessary for the operation of commercial air liners, planes of the War Training Service and Civil Air Patrol aircraft.

o o o

Manpower Now No. 1 Railroad Problem

Washington

• • • **Hard on the heels** of government concern about draft calls causing production lags in war industries, particularly in aircraft, come reports that the country's railroads are experiencing similar difficulty.

Government officials and railroad executives prominent in the industry's affairs here now list the manpower shortage as the No. 1 railroad problem for the government to solve. Formerly, the industry had said that materials were the principal bottleneck to better and more efficient transportation.

WMC has been asked by the railroads to recruit for them 80,000 workers this year. This recent request is being handled by WMC through the setting up of recruitment centers.

However, one official of the American Association of Railroads says the industry is skeptical about how much WMC will be able to do for the railroads. This official says that to date all the railroads have been able to get in the way of help with this problem is sympathy.

Far from looking on the father draft as helpful, railroad men say that it will only aggravate their very serious plight. More than 175,000 men have been drafted from the railroads, and AAR reports that in the fiscal year ended July 1 the railroads had to employ 1,000,000 men to obtain an increase of 40,000 employees over the 1942 hiring. This is said to point up the industry's trouble in that normally a gain of 40,000 employees could be



NO VACATIONS FOR THEM: High school boys and girls give up vacation fun to help build military aircraft. This is a typical group at a Consolidated Vultee plant.



FLYING FORTRESS OIL TANKS: They will soon take a ride over Nazi-dominated countries. They are produced at the Westinghouse works, Mansfield, Ohio.

made through the hiring of one-fourth as many men.

The draft, labor pirating by industries which can pay higher wages, and the normal turnover among workers is said to cause much worry by executives.

Although steel for railroads is going to be provided more amply by WPB for next year (ODT reports agreement with WPB for a 40,000-car program for 1944), equipment still is tight.

With less equipment and fewer employees, the railroads will have moved about 200 per cent more traffic this year than in the previous high of 1939. In 1944 railroad traffic is expected to exceed 1943 freight hauled by about 7½ per cent in net ton miles.

Handicapped by being placed in a "civilian" category by WPB, the railroads have had to fight for every dollar's worth of equipment put into service since the war began.

An increasing accident rate, and delays caused by lack of motive power, have been noted as the result of government policy. The time lost through freight train delays caused by the locomotive shortage is placed as high as 6083 days a year.

Yet, WPB reports that only about 900 locomotives will be put in service this year. This may be optimistic, observers note, since only 324 new locomotives had been delivered on July 1. On the other hand, AAR says that more than 1100 locomotives were ordered this year.

Only 712 locomotives were given to the railroads in 1942, when traffic had increased 34 per cent above 1941, another record-shattering year. In 1918, a war year, 2083 locomotives were placed in service. The difference is represented by locomotives shipped abroad for the use of other United Nations.

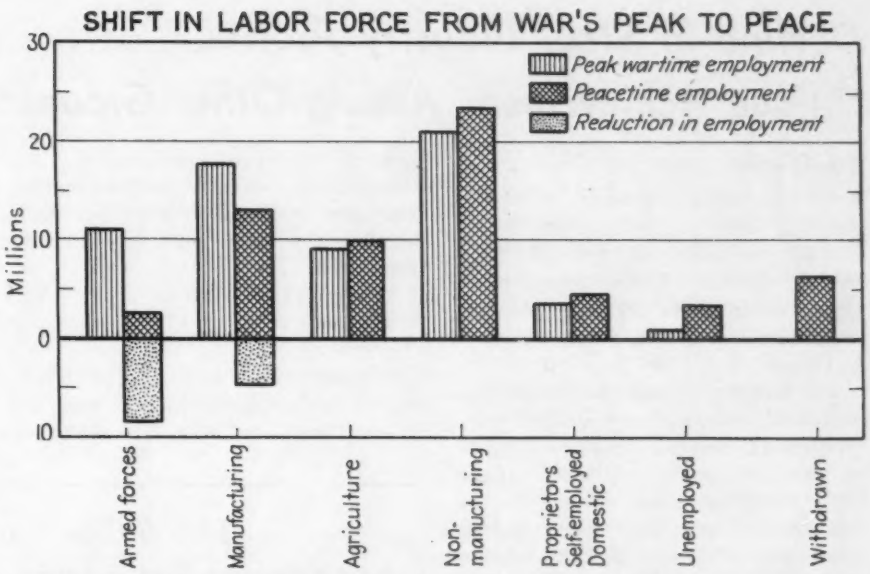
Government officials say that there is a serious car shortage, that there should be 30 to 40 per cent more cars in service to avoid local shortages. Yet in the third quarter of this year, WPB did not grant any materials to ODT for cars.

In the fourth quarter of this year, WPB allotted ODT for transportation needs about 1,400,000 tons of steel. Though the major part of this will go to the railroads, the nation's requirement for barges and automotive equipment must be taken out of it.

Material for more than 9500 new cars to be constructed this year and next was also scraped up by WPB. Some of these cars will be all-steel, it is reported. Approximately 15,000 tons of steel will be devoted to this purpose.

It is expected that about 28,000 cars will be delivered this year, according to ODT. Included in this figure are the 20,000 cars programmed by WPB, 6000 carried over from 1942, and the number of cars which may be expected to be delivered from WPB's last allocation.

ODT has earmarked 400,000 tons of the fourth quarter allotment for rail. About 240,000 tons more will be given over to rail accessories such as frogs and switches, etc. Maintenance and repairs will be 300,000 tons.



THIS CHART was adapted from the report on post-war problems issued recently by the National Resources Planning Board.

o o o

Manpower Pinch More Serious in Steel

Pittsburgh

• • • **The steel industry's** big headache throughout the balance of the year will be one of attempting to maintain an increased steel production, as the manpower shortage increases. Thousands and thousands of less essential workers have already been lost to the armed forces, and more are to go.

More serious, from the standpoint of continuing production, is the increase in numbers of inductions involving key men, some of whom have been deferred before but who are now expected to be called.

Remaining key steel workers have been spread thin because of inductions and also because of new steel capacity. Practically all companies which have under construction, or will soon operate new steel units, are having extreme difficulty in obtaining the required number of workers.

The Carnegie-Illinois Steel Corp., up to a week or so ago, had 36,492 of its workers in the armed forces. In many cases, too, the demand for women in the armed forces has probably had at least some effect on the availability of women for industrial jobs. One company believes that close to 7,000 of its workers will be called within the next six months, only about half of whom can be replaced by women.

As predicted several weeks ago in this magazine, the 48-hr. week in the steel industry is by no means an answer to the labor shortage. The whole 48 hr. a week question has simmered down to a point where all employees are on a 48-hr. week or else, where they are not on a 48-hr. week, appeals have been made and, hence, no violation of the law is indicated.

•

Buffalo

• • • **Buffalo district** steel mills report 95 per cent of the industry's workers now are working a week of 48 hr. or longer.

In spite of this, labor is complaining over the failure of providing an extra eight hours for the 5 per cent remaining on a 40-hr. week, and the practice of shifting workers from regular jobs to other jobs for their overtime periods. Union officials want the workers kept on their regular jobs for the full 48 hr.

Decline in Steel Industry Profits Unique Achievement Among Other Groups

New York

• • • **The steel industry** is distinguishing itself in another way in this war, besides smashing through all obstacles to achieve a magnificent production record. As the war goes on, its profits are sliding downward at a fast clip.

The industry's business volume has mounted, but, as shown by the compilation of current financial reports in this magazine last week (page 100), net income has fallen. Labor and other costs have been rising, taxes are sharply higher, certain profitable products virtually have been eliminated in favor of tonnage items needed for war. If shipbuilding and munitions profits could be separated from a few of the reports the decline in steel earnings would be far more startling.

For the biggest share of the industry, renegotiation still is in the preliminary stage.

Net income of 27 iron and steel companies in the first half of this year declined 11 per cent compared with the first half of 1942, according to the National City Bank of New York. This was almost the poorest showing in an industrial group of 14 classifications, exceeded only by the paper products class with a decline of 21.4 per cent. All other industries showed gains including autos and equipment at 37 per cent; railway equipment up 24 per cent; textiles and apparel up 24 per cent; stone, clay and glass up 69 per cent; petroleum up 20 per cent; electrical equipment up 19 per cent; machinery up 18 per cent.

According to the bank's compilation, the annual rate of return in the iron and steel industry declined from 6 per cent in 1942 to 5.2 per cent in 1943, lowest 1943 figure in the entire list of 14 industrial groups.

Steel industry payrolls during June were the highest for any 30-day month on record, totaling $136,217,000 for the month, according to the American Iron and Steel Institute. In May, a longer month, steel payrolls amounted to $137,404,000 while in June a year ago $118,067,000 were distributed to steel company employees.

Employment in the industry in June declined slightly to a total of 631,000 as against 632,000 employees in May and 659,000 in June of last year.

Average hourly earnings of wage-earning employees amounted to 112.7 cents in the month of June, which compares with 113.4 cents per hour in May and 102.0 cents per hour in June, 1942.

The average number of hours worked per week by all wage-earning employees, including those who may have been on the payrolls for only a day or so during the month, was 43.3 in June, compared with 41.9 hours per week in May and 38.7 hours per week in June a year ago.

Federal taxes for corporations of the nation in 1944 will be double what they were in 1942, according to Secretary of the Treasury Morgenthau. Probably the federal tax bill next year will be $14,000,000,000, he estimated. Last year, corporations paid $7,165,575,126 in federal taxes. In World War I the tax bill peak was reached in 1918 at $3,158,764,000.

Taxes paid for 1942 included $2,947,571,201 normal taxes, $796,999,565 surtax, $6,452,662 of declared value excess profits tax and $3,356,550,698 excess profits tax, and represented a gain of 181 per cent over 1941 and were 25 times greater than the $285,576,000 paid in the depression year of 1932.

The report covered returns filed for the calendar year 1941, a fiscal year ending with the period July, 1941, through June, 1942, and a part year with the greater portion of the accounting period in 1941.

It often happens that federal taxes ostensibly levied against earnings actually take more than 100 per cent of the income of an entire industry over a period of years, and thus imperil prompt and effective postwar readjustment, according to the National Industrial Conference Board, which has just completed a comprehensive study of the effect of taxes upon business policy.

The fact that taxes technically computed as a percentage of profits may actually exceed earnings fairly determined is a result of the technical procedures employed in arriving a tax liability, which are not well suited to the numerous industries which normally experience wide fluctuations in earnings from year to year, or from period to period, the Board finds.

A period of unusual wartime productive activity tends to intensify the cyclical experience of some industries. The machine tool industry, for example, is building lathes and other tools for war use that will virtually destroy the postwar market of the industry for several years. Yet the entire present income of the industry is being taxed at war rates with the privilege of carrying back the losses of only two postwar years and applying them against 'war' profits.

$3.5 Billion Pared From Profits

• • • Renegotiations of war contracts by the price adjustment agencies of the War and Navy Departments and the Maritime Commission through June 30 resulted in commitments for the elimination of "excessive" profits in the amount of $3,555,174,000, according to a joint report issued Aug. 3. Of the total $1,523,748,000 represented the recovery of excessive profits realized and $2,031,426,000 represents price reductions for future deliveries on existing contracts. The breakdown follows:

	RECOVERIES	PRICE REDUCTIONS	TOTAL
Army	$1,090,600,000	$1,406,800,000	$2,497,400,000
Navy	388,305,000	581,149,000	969,454,000
Maritime Commission	44,843,000	43,477,000	88,320,000
Total	$1,523,748,000	$2,031,426,000	$3,555,174,000

The rate of renegotiation is continuing to be substantially accelerated, the agencies report. As of the end of June, written or oral agreements covering 1942 fiscal year prices and profits had been reached with 3611 war contractors. By agencies, the breakdown was as follows:

	CASES SETTLED	CASES IN PROGRESS	TOTAL CASES ASSIGNED
Army	2,894	4,796	11,941
Navy	262	2,320	3,198
Maritime	91	313	443
Total	3,611	7,429	14,682

Note—It was estimated last Spring that there were about 240,000 War Department contracts outstanding, 62 per cent of them being Ordnance Department contracts. The total dollar value was about $75,000,000,000.

Maritime Will Proceed With Building Of Its New Victory Ships, Asserts Land

Washington

• • • **"Any jackass** knows that you can build more Liberty ships than anything else. We are going to build as many Victory ships as we can get turbines."

Thus, Admiral Emory S. Land, chairman of the Maritime Commission, disposed of the question raised by shipbuilders of how much tonnage would be lost in 1944 because of the building of faster ships, or Victories. In an interview on Monday he told THE IRON AGE that the controversy of faster vs. slower ships had been ended.

See Washington Comment, page 98, for more Maritime program news.

"No one can complain," he said, "about how many faster ships are built in 1944 so long as we meet our construction schedules." He inferred they would be met.

Meanwhile, Maritime announced recently that contracts for 411 Victory ships aggregating 4,365,000 tons had been let so far. It is reliably reported that Maritime will seek 24,000,000 tons of ocean-going shipping in 1944 although its announced goal is only 21,000,000 tons.

Many objections have been raised by WPB shipping officials to the building of a large number of the faster ships. One ship designer is reported to have declared that the Victory ship program will cause the loss of 2,000,000 to 4,000,000 tons of shipping in 1944, and that Victories cannot be built quickly enough to make up speedier convoys before the end of next year. Maritime has argued that the faster ships will not require convoys.

The tonnage which WPB claims will be lost will result from the time taken to change over yards to the building of the Victories. Another consideration, WPB contends, is the fact that deliveries may be held up by the slowness in procuring turbines necessitated because Maritime will be competing with the Navy for the machinery. The WPB authority says that since it takes about 8500 h.p. to drive the Victory and only 2500 to propel the 4½ knots slower Liberty, peacetime competition will force the Victories out of trade because 75 to 80 per cent of all cargoes are low grade. The point is made that since the Victory consumes more fuel that many shippers could not afford to ship low grade cargoes on fast ships.

Admiral Land said that anybody's guess would be as good as his concerning post-war shipping economics, but that in the 1937-39 period the United States Merchant Marine was anchored because it could not compete with faster foreign vessels built by the British, Denmark and Norway.

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158 New Merchant Vessels Delivered In July Make Total of 1046 for 1943

• • • **American shipyards** during the first seven months of 1943 delivered into service 1046 new merchant vessels aggregating 10,485,500 deadweight tons, the Maritime Commission announced Aug. 4. This tonnage, equivalent to the ocean-going deadweight tonnage of the American Merchant Marine prior to Pearl Harbor, was reached for the year's ship construction schedule at the end of July when the month's production was 158 new vessels totaling 1,670,700 deadweight tons.

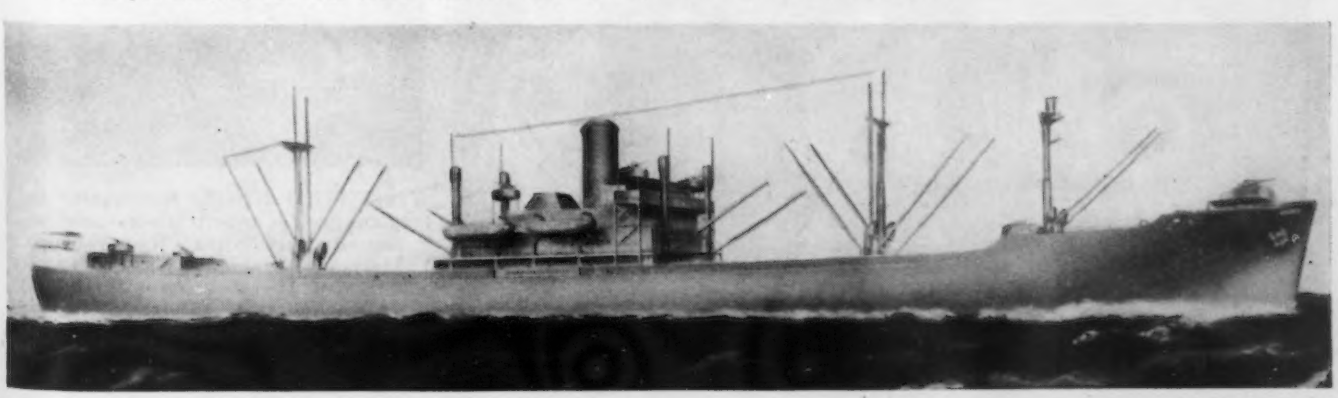
While the actual number of ships delivered in July was nine short of the previous month (167 ships with a deadweight of 1,670,400 tons) the tonnage remained approximately the same, due to construction of larger units.

The Commission pointed out that during the seven-month period ship production has been stepping up to nearly peak capacity. Total tonnage delivered thus far has now passed the half-way point in the scheduled production of more than 19,000,000 deadweight tons of merchant ships and special craft for the armed services by the end of this calendar year.

In addition, the seven-month record was achieved despite the fact that some of the yards have had to convert their facilities for construction from Liberty ships to tankers, which delays delivery slightly.

Of the 158 new ships delivered during the month of July, 109 were Liberty ships, 16 standard C-types, 5 coastal cargo ships, 14 Maritime Commission tankers, 1 private tanker, 1 coastal tanker, 2 special types, 5 seagoing tugs, 3 ore carriers and 2 concrete barges. West Coast yards delivered 77 vessels, East Coast yards 47, Gulf Coast 22, and Great Lakes 12.

PREVIEW SKETCH: The new Victory type ship, designed by the Maritime Commission. It is designed to make 15 knots per hour, about four more than the Liberty ship. This is an artist's sketch.



Gains In Blast Furnace Output Not Rising As High Now As Predicted

• • • **How are** blast furnace operations holding up? Reports compiled at the start of this week by THE IRON AGE indicate that production now is a little better than expected at this time of year when some experts had looked for a large increase in stacks idle for repairs. On the other hand, some districts are not showing the gains in output that were anticipated in view of the new capacity which has been installed.

For the first six months of this year, pig iron output reached 30,343,-443 net tons, compared with 29,430,-871 tons produced in the same period last year. Although blast furnace capacity available for the first half of 1943 increased 1,553,775 tons over that of 1942, the increase in production amounted to only 912,572 tons. In July considerable production was lost due to the coal strike. U. S. Steel Corp. alone estimated it lost 272,000 tons of pig iron due to furnace shutdowns plus inroads upon inventories.

Reports from leading centers are as follows:

Birmingham

• Nineteen blast furnaces currently are in blast in Alabama compared to 21 for the corresponding time in 1942 when every active stack in the state was in production.

The two Alabama furnaces now idle are the Holt furnace southwest of Birmingham and the No. 4 furnace at Ensley. Both are down for relining. The Holt stack has been idle since July 22 and is expected to be back in production about Oct. 1. The Ensley furnace has been idle since June 23 and is expected to be blown in Aug. 22.

The Holt furnace was on ferromanganese and the Ensley furnace on basic when taken off. A third Alabama furnace that has been idle recently was blown in Aug. 2. It was the No. 1 furnace of Sloss-Sheffield, blown in after being off for 18½ days for relining from the mantle up.

Buffalo

• Three out of 16 blast furnaces at five Buffalo plants—Tonawanda Iron Co., Bethlehem, Wickwire, Republic and Hanna Furnace—are idle compared with one idle at this time last year. Two furnaces, good for 1000 tons a day, went out of production at Wickwire shortly after noon last Wednesday because of a strike. One at Bethlehem is out for relining. Bethlehem had one idle for the same reason this time last year. The only new furnace is the 1200-ton DPC job blown in at Bethlehem in May. Except for three or four relinings and the new strike at Wickwire, Buffalo blast furnaces have been producing at capacity for more than a year.

Chicago

• The total number of blast furnaces available in the Chicago area is 40, as compared with 39 a year ago. However, three additional furnaces are building, one of which is scheduled to be blown in within a month, while the other two may be completed by fall if adequate WPB aid in obtaining equipment is kept available. Of the 40 furnaces available here, 38 currently are producing iron.

Compared with a year ago, iron production now is only slightly higher. In many cases old furnaces have been pushed far beyond their normal repair time in order to provide an overlapping of an enlarging job or the construction of a new furnace. These older units are beginning to reach the limit of their endurance and are going out probably a little faster as a group than would be normal. However, the iron making capacity of the district is being balanced by the new facilities as well as by enlargement programs.

Carnegie-Illinois Steel Corp. currently is blowing in 21 out of 23 furnaces. A year ago 22 furnaces were operating. One furnace at Gary and one at South works are down for relining this month. The corporation has not built any new furnaces in this area, but has enlarged No. 7 at Gary. Inland Steel has six out of six operating now. A year ago five out of five were producing. This company put one new furnace in operation a short time ago. Two additional DPC furnaces are being built, one of which

TRAINING FOR POSTWAR ERA: Here is a class at the Carnegie-Illinois Homestead Works training for postwar steel export sales. U. S. Steel Export Co. is arranging the classes for men from distant nations.





VISIT FORT KNOX: Secretaries and managers of nine trade associations toured Fort Knox, Ky., recently. Herman H. Lind looks on while James C. Ingerbretsen is fitted with special goggles. Charles S. Pearce, managing director, Porcelain Enamel Institute, was in the party also.

is expected to be put into operation within a month.

Interlake Iron has three furnaces out of three in this area producing. Its other furnaces at Toledo, Erie and Duluth are operating full.

Republic Steel is building a new blast furnace at its new alloy works in South Chicago but no date has been set for its completion. Youngstown has five out of five operating same as a year ago. American Steel & Wire over the past year moved a blast furnace from Joliet works to Duluth, raising the number at Duluth to two, both of which are in operation. A year ago only one of these furnaces was operating.

Pittsburgh

• In the immediate Pittsburgh district there is only one blast furnace idle at the present time, at the Edgar Thomson Works, and it is out for repairs. There is one furnace out for repairs at Mingo Junction. This is a corporation furnace. There is one new furnace in the immediate Pittsburgh district which was blown in on July 20. Another is to come in soon at Monessen. There are no Carnegie-Illinois furnaces out of blast at Ohio works and Farrell works.

As far as the immediate Pittsburgh district is concerned, it now has 46 blast furnaces with 45 in operation this week. As near as can be estimated, last year there were about 45 blast furnaces in the district with two out for repairs.

In the Wheeling district, Wheeling Steel has five blast furnaces with all in, but one is slated to come off for repairs about the middle of this month. Weirton has all three in and did a year ago. All of Wheeling's furnaces were also in operation a year ago. Carnegie-Illinois at Mingo Junction has three furnaces, two of which are now in operation, with one out for repairs. Last year all were in.

So far this year out of the 46 furnaces in the immediate Pittsburgh district about three to four more were out for repairs than was the case in 1942. In the Wheeling district, two to three more were out this year than last year, and there may not have been any out at all last year.

The extra loss in furnaces this year, due to bankings, as compared to a year ago, has probably not amounted to too much because most units were producing more per day in 1943 than they were a year ago.

There will be further bankings because of the need for repairs, but there is no way to tell how many since they are running them until they break through. There were also 14 furnaces banked here for various periods due to coal strike.

In The East

One of the large eastern steel producers has two blast furnaces down for normal repairs out of a total of 31 stacks. All 29 others are reported working.

At Riddlesburg, Pa., the blast furnace there was blown out about July 1, allegedly because of high cost. It was in operation last year.

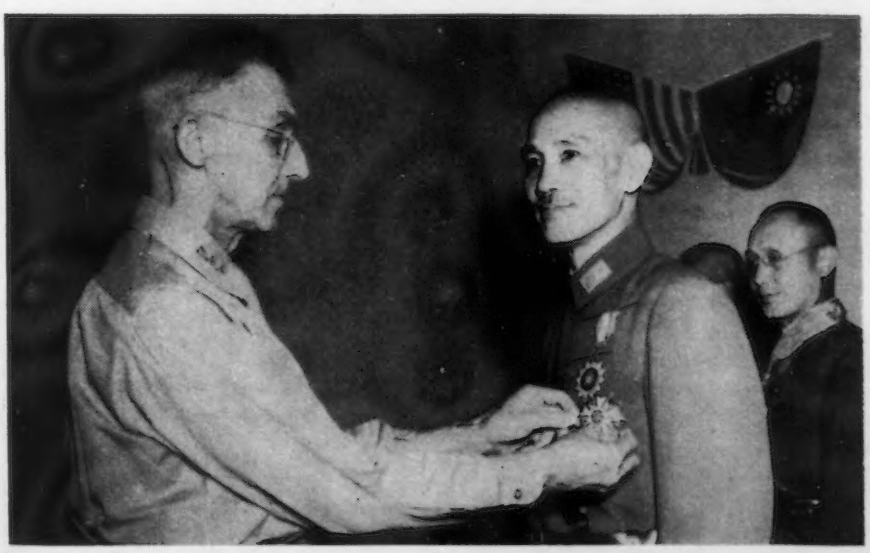
Ohio

• At Cleveland no furnaces are out of blast except the new DPC unit, and two furnaces are down in the Valley district.

The tenth monthly production record in the last 16 months was reported recently at the Hamilton plant of American Rolling Mill Co.

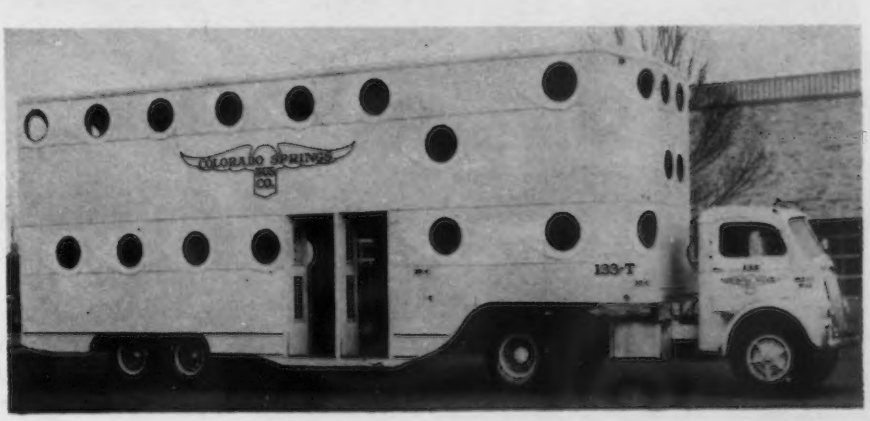
The new pig iron production peak for July topped the previous high, established in May, 1943, by 1581 tons. The May figure had represented an increase of 1090 tons over the then existing record.

In a telegram to Donald Nelson, chairman of WPB, members of the Hamilton Plant's War Production Drive Committee stated, "About one out of every six Hamilton Armco men have gone into the armed forces and we promised to back them up. We are doing it. We have now pushed our monthly record figure so high it will be difficult to top it. However, we made all the other records with teamwork and if that is what it takes then we will top this new one too. Equipment alone doesn't win a war; the spirit of the men who use it does. We pledge to you our continued wholehearted effort."



FROM U. S. TO CHINA: Lt. Gen. Joseph Stilwell decorates Generalissimo Chiang Kai-Shek with the Legion of Merit Order on behalf of President Roosevelt. The order was in the degree of Chief Commander.

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SOLDIER TRANSPORT BUS: In operation at Camp Carson, Colo., for transporting soldiers is this huge bus which is said to seat 250 men.

Consistency in Cost Figures, Other Aids Urged by Army Accounting Officer

• • • **War Department** accounting procedures were outlined recently in a speech in Boston by Lt. Col. John W. McEachren, chief, audit division, Office of the Fiscal Director.

He discussed the duties of war goods contractors, and stated that elements which enter into costs determination include the prime contractor's total cost, his portion of profit applicable to the incomplete part of the contract, the claims of his subcontractors and costs incurred by the prime contractor subsequent to the termination of the contract.

Said Lt. Col. McEachren:

"War Department accounting activities in connection with the determination of contract costs may be broadly divided into those dealing with cost-plus-fixed-fee contracts and those dealing with fixed-price contracts.

"Accounting operations involved in the termination of cost-plus-fixed-fee contracts are much simpler than those for fixed-price since the machinery for reimbursing the contractor currently for his costs has been functioning. The termination of fixed-price contracts presents the most serious problem in all War Department accounting activities.

Many of the cost-plus-fixed-fee contracts incorporate T.D. 5000 by reference as a definition of cost or include certain paragraphs selected from T.D. 5000. Since it is not practicable to write a cost definition in sufficient detail completely to fit every situation, and T.D. 5000 is no exception to this rule, it has been necessary to issue a series of cost interpretations which are intended for the information and guidance of War Department personnel concerned with cost-plus-fixed-fee supply contracts . . . The cost interpretation on the subject of overhead costs probably is of most interest. Certain general principles are outlined therein, one of the most important of these being consistency. In this respect, it is essential that the same bases (proportionate direct labor dollars or hours, etc.) be followed in a particular overhead unit (plant, department or burden center) throughout the entire performance of the contract.

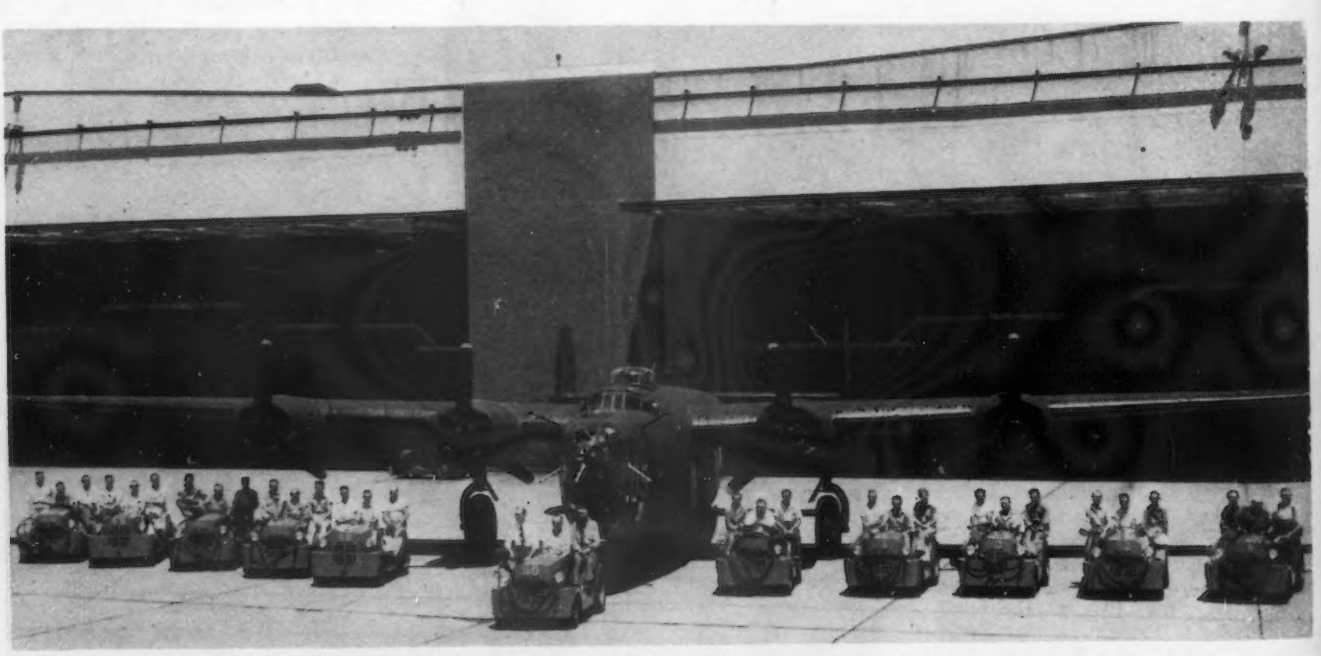
• • • The procedure to be followed in negotiating the termination of military contracts before their completion is a subject of much interest now. Factors which must be considered on unfinished orders are outlined in the accompanying address, given by Lieut. Col. McEachren in Boston in June before a group of accountants.

"It should be noted that consistency in *principles* is required, which does not mean that physical changes in production facilities and methods cannot be reflected in the bases for overhead proration. The departmental accounting classification may be changed if there are actual changes in processes, organization or layout. Consistency requires, however, that a particular type of cost cannot be charged as a direct cost during part of the performance of the contract and as overhead for the remainder of the period of performance. It also means that overhead cannot be prorated on direct labor dollars, as an example, for part of the period of performance and on some entirely different basis for the remainder of the period.

"Another important requirement of the overhead cost interpretation is that the basis of the charge must be

(CONTINUED ON PAGE 126)

ELEPHANT AND MOUSE: This modern version of the Army mule, called the "armored mule," proves to be more than a match for the B-24 Liberator on the ground. Developed by Ford-Ferguson at the request of the Navy, this 5000-lb. unit, known officially as the Moto-Tug, is used widely on docks, shipyards, and airfields.



Cutbacks Will Reduce 1944 Machine Tool Production Sharply, WPB Reveals

Washington

• • • **The volume** of machine tool production will drop to a 1944 level of between $300,000,000 and $500,000,000 from production worth slightly under $1,000,000,000 this year because of cutbacks ordered by WPB, it was revealed at a meeting held on Aug. 3 by the Machine Tool Industry Advisory Committee.

A press statement ostensibly covering what happened at the meeting was issued last Monday by WPB. The statement gave no indication of how much machine tool production has been cut nor what method is being used.

The curtailment in production will not be felt by the industry until October, said John C. Chaffee, chief of the Tools Division through a WPB spokesman. At the same time, Mr. Chaffee declared that the fourth quarter allotment for machine tools represented only 40 per cent of the second quarter allotment.

The industry's excess capacity will be partly filled in the ensuing months by contracts for the manufacture of valves, turbines, superchargers, airplane engine parts, gun mounts and signal corps equipment. The WPB statement says that plans were discussed for the conversion of the industry, but does not say how they are going to be carried out.

With respect to pool orders the press statement says further that the issuance of new pool orders has been discontinued following a. recent policy decision by the Armed services and WPB, and that committee members emphasized that the discontinuance of the pool orders would inevitably force down production, as "machine tool builders without pool orders will be forced to operate within their firm order pattern."

The third Russian protocol will call for more tools to be delivered to Russia than the second protocol. Shipments to England are declining, it was developed, inasmuch as Britain is supposed to be tooled up to about the same degree as the United States.

It is reported that the methods WPB will use in curtailing production are three: Limitation of new orders, abolition of pool orders and curtailment of the amount of material made available for tool construction.

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Battlefield Scrap Volume Increasing

• • • **Reflecting** the rising volume of battlefield scrap being received in this country, OWI's United Labor Press Service says that in May ships docking at one port deposited 1500 gross tons of ferrous and 200 tons of nonferrous scrap while in June 2700 tons of ferrous and 763 tons of scrap were received. Because of the rapid growth of scrap piles the figures for both months are incomplete.

Hundreds of boxes of repairable airplane engines, the statement said, are included in the return cargoes. In May the items for repairs and eventual reissue received at one port included 4400 55-gal. steel drums and 135 tons of half track.

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Timken Speeds Production Of 40 and 75-Mm. Gun Barrels

Canton, Ohio

• • • **Production** rates as high as 6000 barrels per month are now possible through the use of seamless tubing for 75 and 40-mm. gun tubes, officials of the Timken Roller Bearing Co. said this week.

The use of tubing for gun barrels was disclosed in trade magazines a few months after Pearl Harbor. The Timken process involves upsetting the breech end from seamless rolled to the diameter of the barrel, instead of forging, machining and rifling.

Three hundred gun barrels a month used to be considered a high rate for large shops under the former method. The guns are mounted upon tanks, planes and ships.

Republic Buys Everhard

• • • **Republic Steel Corp.** purchased the Everhard Mfg. Co. at Canton, Ohio, it was announced Tuesday. Everhard, normally a producer of window screens and storm windows, is now engaged in war work. H. H. Everhard, who organized the company in 1911 and served as president and treasurer, will continue with the organization.

Ohio Plant New Subsidiary Of American Brake Shoe Co.

• • • **American Brake Shoe Co.,** New York, has purchased the Electro Alloys Co., Elyria, Ohio, one of the leading producers of heat and corrosion resistant alloys. The announcement was made by William B. Given, Jr., president of American Brake Shoe. Walter G. Hoffman has been made president of Electro Alloys and W. C. Whyte, its previous president, is to continue in much the same executive capacity as before under the title of vice-president. The addition of Electro Alloys brings the number of Brake Shoe plants to 59, located in 21 states and Canada.

Fuel Officials Suggest Priority on Coking Coal

Washington

• • • **Coking coal** may be put under priority control soon if a plan devised by fuel officials is adopted by WPB. An A-1 rating would be made available to such coke users as the steel mills, the malleable iron foundries and the chemical industries. WPB officials say that the plan would guarantee these industries a steady supply of coking coal and would also regulate inventories.

Companies who have more than a 30-day inventory would be permitted to purchase 60 per cent of the normal monthly supply for the next 30 days' operation. Whenever the company's inventory goes below a 30-day supply the company would be permitted to purchase as high as 120 per cent of normal monthly stocks, using the rating assigned to accomplish the buying.

COMING EVENTS

Sept. 28 to 30—Iron and Steel Engineers convention, Pittsburgh.
Oct. 13 to 16—The Electrochemical Society, Inc., New York.
Oct. 18 to 22—National Metal Congress and Exposition, Chicago.
Oct. 28, 29—American Institute of Mining Engineers and American Society of Mechanical Engineers, Pittsburgh.

WPB Wins Dispute With Army Over Reduction of CMP Class B List

Washington

• • • **The Army-WPB** wrangle over whether the CMP Class B list should be reduced to 22 product classifications has terminated in favor of WPB. If the Army had won WPB industry divisions would have had their authority to deal out materials cut to authority over about 1,000,000 tons of steel.

Last Thursday, J. A. Krug, WPB program vice-chairman, announced what was described as the "final action with respect to any major Class B product reclassification." Mr. Krug made public nine changes which are effective beginning with the first quarter of 1944.

Depending upon the decision of what would be done about the CMP product list, was the Component Scheduling Procedure adopted by WPB several months ago. CSP was to be to components what CMP is to materials. Components were to be flowed, once supply and demand had been ascertained.

If the CMP B product list had been reduced to 22 items, a WPB spokesman says that the CSP would have been tossed out the window. Now, an agreement must be reached between WPB and the armed services as to the area CSP is to work in. Informed sources say that the scope of the order will be reduced.

One important WPB official has said that CSP will only be used when put into operation as a last resort when every other method of getting components to manufacturers has failed.

The type of scheduling under CMP and industry consultations, including the work of expediters, will be employed before the CSP and its forms are called into operation. Also, according to WPB, there remain several points of conflict with CMP which must be ironed out of CSP.

Special military communications equipment becomes a Class A product. Air and hydraulic brakes, automobile wheel assemblies, tire chains and carburetors (except aircraft carburetors) become Class A products for Army programs only. Metal cots, bunks and berths; gas cylinders; carbon dioxide portable fire extinguishers; and metal hospital beds become civilian Class A products.

Experience with CMP indicates it is basically sound, WPB officials said, and indicated that future changes will be limited in scope and made only when it is clear that tangible benefits are to be derived.

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Mystic Furnace Gets New Aid on Prices

• • • **OPA said it has** permitted Eastern Gas & Fuel Associates, Boston, to raise its maximum base price for sales of pig iron produced at the Mystic furnace from $1 above the ceiling price to $2 above the ceiling price, effective as of last May 20. The order was issued on July 9 but was not made public by OPA until last week. The petition from the company was filed April 24.

Order No. 7 under Revised Price Schedule No. 10 (Pig Iron) is the one giving the company its new permission, superseding and revoking Order No. 1 issued April 14, 1942.

Eastern Gas and Fuel Associates must file with the Office of Price Administration before the end of each calendar month following the effective date of the order an itemized statement of costs incurred in the production of pig iron during the preceding month, also a profit and loss statement on blast furnace operations as of the last day of the preceding month.

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Delivery Provisions of Steel For Testing Purposes Eased

Washington

• • • **Provisions of** CMP Regulation No. 1 with respect to delivery of sample orders of steel for testing purposes have been modified to permit purchasers to receive up to 1000 lb. of any one composition or a total of 3000 lb. of all compositions. This applies to all types of steel except stainless, tool steel and steel castings.

Sample order delivery requirements for testing purposes on all other controlled materials, including stainless steel, tool steel and steel castings, continue to be limited to one per cent of the minimum mill quantity which is prescribed with respect to the various types of controlled materials in Schedule IV of CMP Regulation No. 1.

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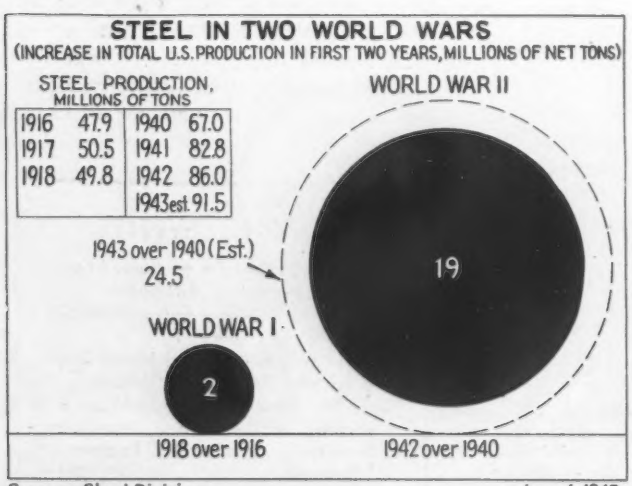
Reinforcement Metal Edging

• • • **Reinforcement metal** edging on returnable cases such as are used for delivering bottled beer, bread, etc., WPB announced last week, are not classified as metal strapping under Conservation Order M-261.

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New Forms Issued by WPB

WPB-439—Delivery schedule of toluene producers and production, purchases and stocks for second preceding month.
WPB-3083—Data on internal combustion engine components: Crankshaft, camshaft and connecting rod.
WPB-2362—Columbium: Statement of stocks and consumption and request for allocation. Monthly.
WPB-2920—Secondary lead and antimonal lead in pig form: Producer's report on production, stocks, shipments. Monthly.
WPB-2064—Class B welded, and weldless chain manufacturer's monthly report of shipments and orders.
WPB-2779—Manufactured crude abrasive: Application for authority to accept delivery.
WPB-2884—Pig iron production data and summary of producer's schedule. Monthly.
WPB-2954—Application by brass mills for authorization to sell or purchase brass mill products and copper-base alloy slabs or billets for further processing by brass mills. Monthly.



Source: Steel Division June 1, 1943

WPB Get Approval Program for Essential Consumer Goods Production

• • • **The Office** of Civilian Requirements has presented to WPB a tentative program for the production of essential consumer goods necessary for the efficient functioning of the civilian economy, WPB vice-chairman Arthur D. Whiteside announced Aug. 5:

The fact that certain essential articles will be produced does not mean that OCR intends, because of the critical materials required, to reopen substantial manufacture of many items formerly produced for civilians, Mr. Whiteside said in summarizing the first report of his office to WPB.

OCR recommendations now will go before the WPB Requirements Committee which will go over them, in conjunction with the general war program, to decide what materials can be spared.

"The civilian standard of living has been high during the past three years," the OCR report points out, "and despite shortages in specific items and areas the general level at which products and services have been supplied to civilians has been adequate to date."

The principal problems facing OCR, according to the report, are:

1. Shortage of manpower, particularly in the service trades.
2. Inadequate distribution of scarce goods.
3. Lack of some materials, particularly metals, for civilian manufacture.

The report states frankly that OCR has not solved the complex problem of distribution to the end that all localities will have a proportionate share of scarce items, but plans are being developed to relieve this situation.

o o o

Civilian Allotment Escapes Slash

Washington

• • • **A reduction** in the allotments of carbon steel for the fourth quarter for all claimant agencies except the Office of Civilian Requirements was the most significant development of the WPB Requirements Committee announcing the completion of its fourth quarter allocations. An increase in supplies of civilian goods was forecast by THE IRON AGE of Aug. 5, page 80.

WPB Chairman Nelson said: "If it becomes necessary to produce a given quantity of cook stoves or farm machinery or whatever, to maintain civilian health and welfare we are going to produce them regardless of the scarcity of the materials involved."

WPB also let it be known that the steel allotments for the fourth quarter are final and the Requirements Committee will not as in the past entertain requests for supplemental quantities.

Mr. Nelson added that supplies of controlled materials have in no way caught up with demands. Copper production particularly is adversely affected by current serious manpower shortages, he said.

Requests of the Army, Navy, Aircraft Resources Control Office and Maritime Commission for carbon steel were reduced by about 9 per cent in the fourth quarter allotments. All other requests, including those for export, were cut about 17 per cent while the civilian allotment was the only one to show an increase. Reports of heavy over-buying by the Army and recent military successes may have played a large part in reducing the military allotment.

Total requests from the 16 claimant agencies for carbon steel amounted to slightly more than 19,500,000 tons as against an estimated fourth quarter supply of about 15,500,000 tons. The fourth quarter allotments reflect more realistic production programming as the over-all reduction of the claimants requests amounted to only 13 per cent against a third quarter slash of 25 per cent.

Sheet & Tube Record Broken

Youngstown

• • • **Youngstown Sheet & Tube Co.** here in July broke an all time record for steel ingot production in its plants, by producing 360,143 tons. It is said that this is better than any previous record made and approximates 103 per cent of rated capacity.

Priority, Price and CMP News of the Week Summarized

Price Briefs

• Amendment 1 to Revised MPR 138 gives specific premiums or differentials which independent warehousemen may charge in sales of standard ferromanganese and other manganese alloys and metals. (Release No. TCS-726)

•

• Amendment 9 to Order A-1 under MPR 188 authorizes a nine per cent increase in the maximum prices for cast iron coal fired warm-air furnaces.

•

• Amendment 8 to Order A-1 of MPR 188 lists uniform dollars and cents maximum prices and discounts for producers, distributors, and retailers for sales of plastic pipe and tubing and plastic pipe fittings and tube fittings, when produced from certain Vinylidene chlorides known commercially as Saran B-11. (Release No. TCS-747)

•

• Amendment 18 to MPR 188 expands coverage of the regulation to include pipe and tubing manufactured from Saran B-11. (Release No. TCS-747)

Additional CMP Developments

• Form CMP-32 is now being distributed to be used by contractors in making return of allotments of controlled materials.

•

• Amendment 2 to Reg. 1 modifies provisions with respect to delivery of sample orders of steel for testing purposes to permit purchasers to receive up to 1000 lb. of any one composition or a total of 3000 lb. of all compositions. This applies to all types of steel except stainless, tool steel and steel castings. (Release No. TCS-769)

•

• Direction 23 to Reg. 1 states that a producer must refuse orders for delivery of aluminum products, including authorized controlled material orders and orders covered by Aluminum-Magnesium (AM) authorization numbers, unless he expects to be able to make delivery in the month specified in the order. (Release No. WPB-4006)

Priority Changes

L-182—Amended order clarifies the restrictions governing the manufacture and sale of steam-jacketed kettles. (8-3-43)

•

L-272—Schedule VI orders production of standardized and simplified welding apparatus gages. The action is expected to increase production by 15 to 20 per cent. (8-6-43)

•

M-21-h—Direction 1 lifts, to a limited extent, the prohibition on the use of vanadium by tool steel producers in the manufacture of hot work steels and certain other alloy tool steels. (8-5-43)

•

M-261—Amended order clarifies use restrictions of metal strapping on returnable containers. (8-2-43)



No Strikes?

• • • Regardless of no-strike pledges and anti-strike legislation, war production is still being slowed down because of work stoppages in many vital war plants.

• A one-day strike of 60 crane men and hookers in the Merchant Mill warehouse of the Gary plant of Carnegie-Illinois Steel Corp. on Monday forced an additional 500 employees out of work and held up shipments from the warehouse for two shifts. The strikers returned at 7 a. m. Tuesday morning.

• About 1400 workers halted production at the Wickwire-Spencer Steel Corp.'s Tonawanda, N. Y., plant in a three-day strike. The stoppage, the second in two months, was attributed to a wage dispute which was in the process of settlement. Three open hearth and two blast furnaces were taken out of production.

• A two-day strike of 2500 workers at the Ford Highland Park medium tank plant halted production of tanks and anti-aircraft directors for the Army. Estimated cost of the unauthorized strike was set at more than 29,000 man hours lost.

• Production of springs for Army combat trucks and tanks at the Spring Perch Co.'s Lackawanna plant was brought to a standstill when 150 workers walked out because a worker was fired for "incompetence." Workers returned two days later.

• Controversy over Negro students attending a training school for riveters closed the Sparrows Point Yard of Bethlehem Steel Co. when several thousand workers left their jobs. The plant was officially closed for two and a half days.

• Employees of two Allis Chalmers Mfg. Co. plants in Springfield, Ill., voted in favor of a strike in the country's first election under the Smith-Connally Anti-Strike Law.

• A 48-hr. strike by 360 employees at the Sloan plant of Lake Engineering Corp. occurred over what a Steel Workers' official said was the company's "attitude" over negotiation of a new contract with the union. The strike ended when it was agreed to arbitrate.

• Because two crane operators were "docked without satisfactory reason" 300 men in the steel conditioning department of Republic Steel Corp., Buffalo, staged a walkout.

• Three Canadian aircraft plants were closed with the understanding that they would remain so until 20,000 striking workers were willing to return to work with the understanding that the retroactive cost-of-living bonus which they demanded will not be granted. The strike made idle 15,000 other employees of associated industries. The plants involved were Noorduyn Aviation, Ltd., Fairchild Aircraft and Canadian Vickers Aircraft Division.

• A strike in the blast furnace department of Bethlehem Steel Co., Buffalo, lasted for one shift and involved about 50 mechanics and repairmen. The strike hinged around a point of labor relations.

PARISH

METAL STAMPINGS

★

MODERN DESIGN AT LOW COST

★



HOUSEHOLD APPLIANCES

New refrigerators, cabinets, bathtubs, stoves, and a wide range of other household necessities will be a joy to the post-war housewife.

Pressed Metal Parts and stampings will make possible unparalleled efficiency, smart beauty, long life,—all those qualities that lower sales resistance in a competitive world.

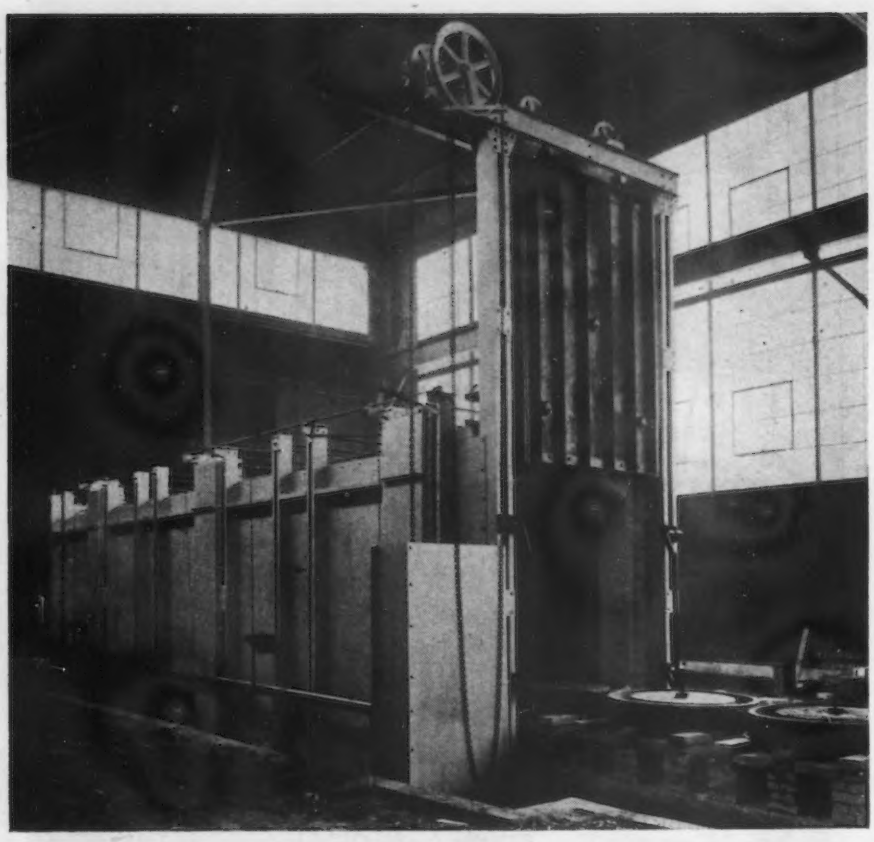
No other method provides *all* characteristics required,—resistance to elements, ability to take hard knocks in every day use, relative low cost, tensile strength, beauty and so forth. Parish Pressed Steel has completely rounded facilities; engineering cooperation in the drawing board stage, all sizes of presses for most efficient production, welding facilities, painting and finishing departments, and full assembly facilities.

It is not too early to plan your new designs. We are ready to work with you in the preliminary stages.

And as our contribution to post-war progress, we are now equipped to stamp, fabricate, and heat treat aluminum, in addition to steel.

ARMY E NAVY

PARISH PRESSED STEEL CO., Reading, Pa.
Subsidiary of SPICER MANUFACTURING CORP.
Western Representative: F. Somers Peterson, 57 California St., San Francisco, Cal.



VERSATILITY is a Feature of This VULCAN FURNACE

Here is a large-capacity, direct-fired VULCAN Furnace, car hearth type, that insures fast, uniform heat treating of steel parts of various shapes and sections; annealing of strip or wire in coils; or other work requiring accurate heating under protected atmosphere.

Temperature range is from 700°F. to 1900°F. Car has alloy bases into which alloy retorts are sealed, enclosing the work for treatment in prepared atmosphere generated outside the furnace in standard atmosphere generating unit. Atmosphere gas is conducted through piping on car terminated by nozzles at each base. Manifold on car has "quick-make" connections and purging valves.

Furnace is automatically controlled in two zones, and may be oil or gas fired or electrically heated. Program control can be arranged to govern rates of heating, holding, cooling. Car and door are motorized. Double transfer car is provided to serve five furnaces.

Consult our Engineering Department regarding your heat treating requirements. Their recommendations will be based on long experience and proven accomplishment.

VULCAN CORPORATION
NORTH 18TH & CHERRY STS., PHILADELPHIA, PA.

Accounting Officer Urges Consistency

(CONTINUED FROM PAGE 120)

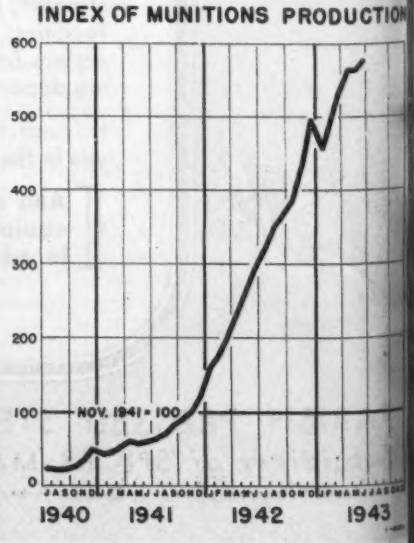
susceptible to check by the War Department audit staffs. Time reports prepared by top executives purporting to allocate their hours of work to specific contracts do not meet this qualification.

"**Any method** of allocating costs to contracts which differs from the usual time-tested and recognized accounting practices must necessarily be carefully analyzed and reviewed by the War Department auditors.

"There has been and continues to be a very wide difference in the speed with which cost-plus-a-fixed-fee contractors present their costs for audit and reimbursement. In some cases, not more than a half of a month's costs on the average are unreimbursed. In other cases as much as two months' costs are outstanding and not presented for audit. Typically, the so-called "100 per cent" plants (those working entirely on cost-plus-a-fixed-fee contracts) present their costs for reimbursement more quickly than the so-called "mixed" plants. The relatively better job done by the 100 per cent plants is due in a large part to the fact that their accounts payable departments have to deal only with transactions relating to the contract. Where the volume warrants, contractors operating "mixed" plants, i. e. having cost-plus-a-fixed-fee contracts mingled with other work should consider the desirability of segregating the accounts.

Termination Accounting

"The magnitude of the procurement program and the continual change in the type of materiel required make





THIS IS THE WHEEL* MR. JONES

● Maybe you were stumped by grinding jobs before, but they won't worry you any more.

300 shapes and sizes—every grade and grain—there is a Chicago Mounted Wheel custom-built to take on *any* grinding problem. Each wheel is a whirling point of power that turns your jobs out smooth—and in a hurry.

PROMPT DELIVERY

Action is the keynote from the moment your order comes in. Our wartime set-up concentrates on mounted points and grinding wheels 3" in diameter and under. —Production is stepped up and keeps pace with demand. Another advantage to you is our central location.

NEW CATALOG—Shows Chicago Mounted Wheels in actual colors, also portable electric tools and time-saving accessories.

CHICAGO WHEEL & MFG. COMPANY

America's Headquarters for Mounted Wheels and Small Grinding Wheels.

1101 W. Monroe St., Dept. RA
Chicago, Illinois



*Half a century of specialization has established our reputation as *the* small wheel people of the abrasive industry.

TEST WHEEL FREE—Tell us the job, type grinder and size wheel you use and we'll send one prepaid.

☐ Send Mounted Wheel Catalog RA
☐ Free Wheel. Size.....
☐ Also interested in Grinding Wheels

Name.....

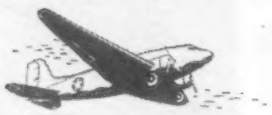
Address.....



As sure as you read this, you will use Stainless Steel wire again *for domestic production*



When that day comes, it is more than likely that there will be many reasons for broader use of Stainless. There may be a more favorable first cost. Working qualities may be known better. War use certainly has put Stainless and Stainless Wire on new ground.



No one is more awake than **PAGE** to this new place of Stainless Steel and Stainless Steel Wire. Currently, war production takes all of a considerably increased output—and gives us rich experience that will be placed at your service when peace comes.



That experience—a plus to the fact that wire has always been the business of **PAGE**—is at your service right now, as you plan.

PAGE *Stainless Steel* **WIRE**

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco

In Business for Your Safety

ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

it impossible to avoid some cancellations and terminations of contracts before completion. Most contracts in number and amount are of the fixed-price variety and accounting problems of a very high level arise when they are terminated. This phase of the discussion will, therefore, be devoted to such contracts.

Standard Termination Article

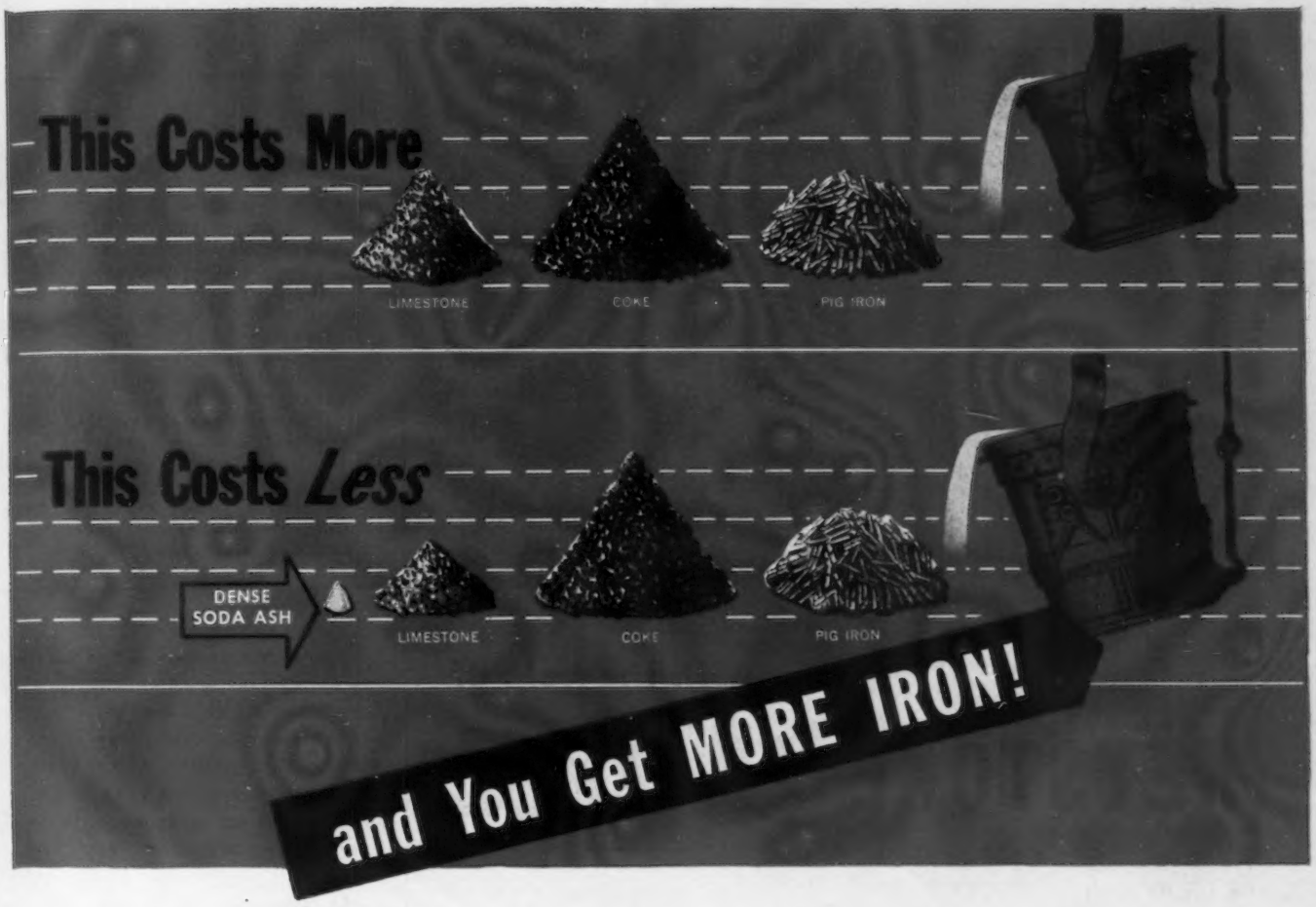
"For some time a War Department standard termination article has been prescribed by procurement regulations issued by the Army Service Forces and it is desirable both from the viewpoint of the contractor and the Government that this termination article be included in all War Department fixed-price contracts. One of the most important provisions in this article is that the contracting officer and the contractor may arrive at a settlement by negotiation. This provision gives the contracting officer considerable flexibility in working out a fair settlement. It is not necessary to document such a settlement with all the detailed evidence such as is submitted to the general accounting office in connection with cost-plus-a-fixed-fee contracts.

"The standard termination article provides that the settlement may include compensation to the prime contractor for his costs, expenditures, liabilities, commitments and work in respect to the uncompleted portion of the contract.

"Provision is also made for reimbursing the prime contractor 'for all expenditures made and costs incurred with the prior approval of the contracting officer in settling or dis-

THE SPLINTERING DOOR.





✓ Are you taking full advantage of the relation between slag volume and coke consumption? . . .

✓ Leaner slag practice will produce more iron in the blast furnace.

✓ Such practice is made possible by the proper use of SOLVAY Dustless Dense SODA ASH to control the sulfur increase.

✓ The cost of the soda ash is approximately offset by the saving in limestone. The results are reduced coke consumption and sulfur control with increased production!

SUCH IMPORTANT PRACTICE DESERVES PLANNING

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 RECTOR STREET NEW YORK, N. Y.

Landing Fields *in a* Hurry



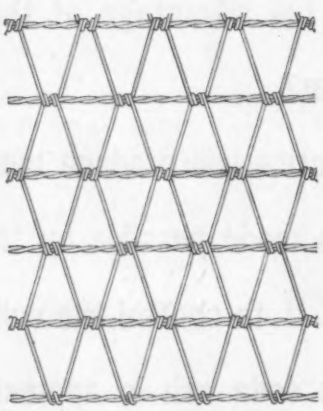
with the help of

KEYSTONE *Wire*

Many advance bases near our fighting fronts are equipped with spot airplane runways in a hurry. Rolls of ready woven and reinforced fabric are quickly unrolled and anchored down. In a mere matter of hours satisfactory landing fields are thus created.

Here is a combat advantage wherein wire mill production plays a major hand. Keystone is supplying many miles of wire fabric for this use—as well as thousands of items to help equip planes, tanks, ships, and guns. Each day of this production brings us that much nearer Victory—when wire and wire mill products will again be rolling . . . to meet a pent up *civilian* demand.

One of thousands of wire mill products for war uses.





British "Tommies" laying chicken-mesh landing mat.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Plastics Are Plated

Chicago

• • • **A process by which plastics, glass or any non-conductor may be plated with any of the plating metals has been developed by Precision Paper Tube Co., 2023 W. Charleston St., Chicago, 47. The company has installed equipment to permit use of this process on a wide variety of materials.**

The company claims that convex and concave surfaces, convolutions, corners and recesses are as thoroughly plated as flat or simple round surfaces, and that the plating will not chip, crack or peel off.

charging that portion of the outstanding obligations or commitments of the contractor which have been incurred or entered into with respect to the uncompleted portion of the contract.

"A profit on the uncompleted part of the contract proportionate to the extent of completion may also be allowed.

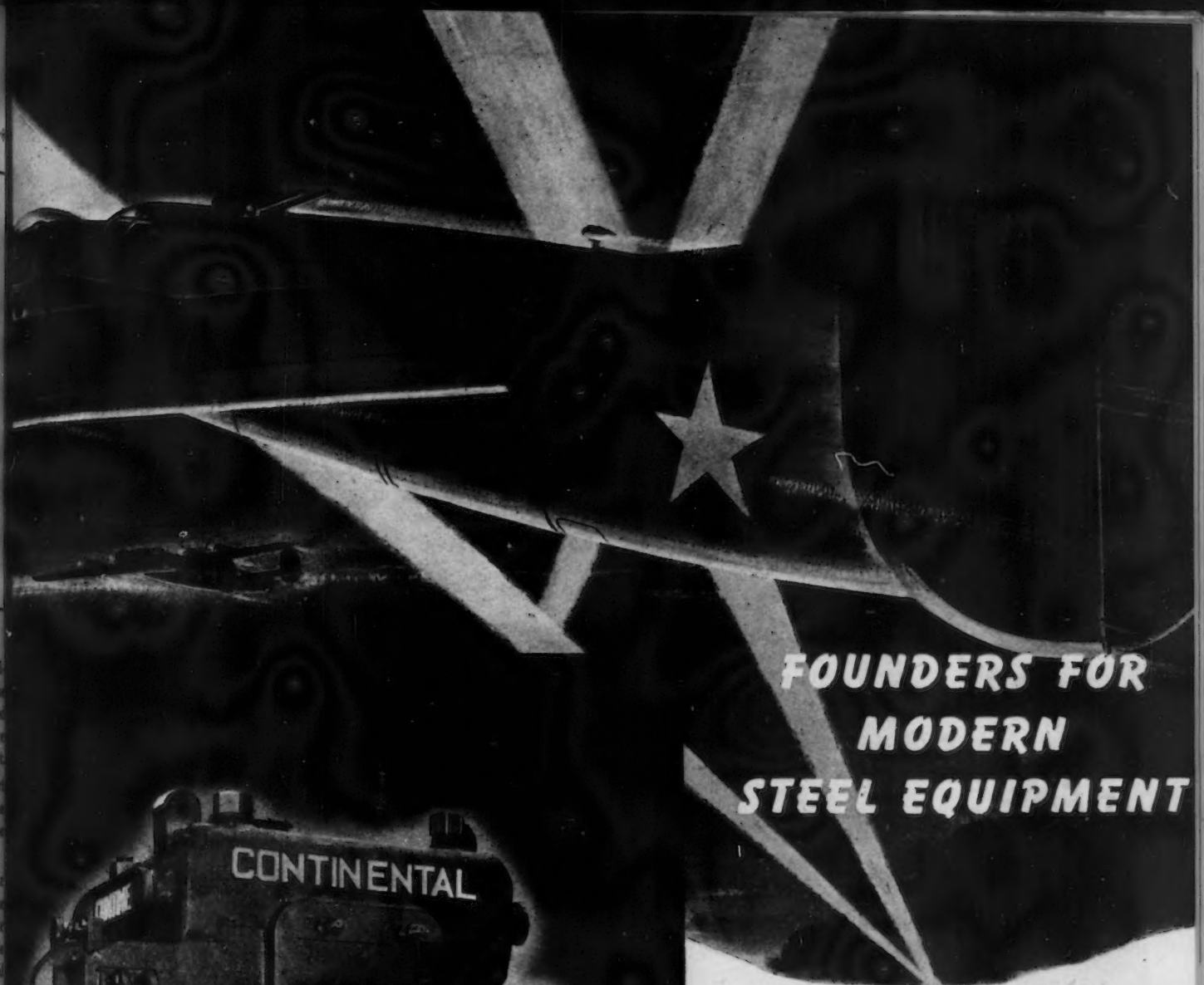
"**In addition,** the prime contractor may be paid for 'such sum as the contracting officer and the contractor may agree upon for expenditures made and costs incurred with the approval of the contracting officer (a) after the date of termination for the protection of Government property and (b) for such other expenditures and costs as may be necessary in connection with the settlement of this contract.'

"Provision is made for prompt partial payments to the prime contractor to the extent that, in the judgment of the contracting officer, such payments are clearly within the amount due under the settlement.

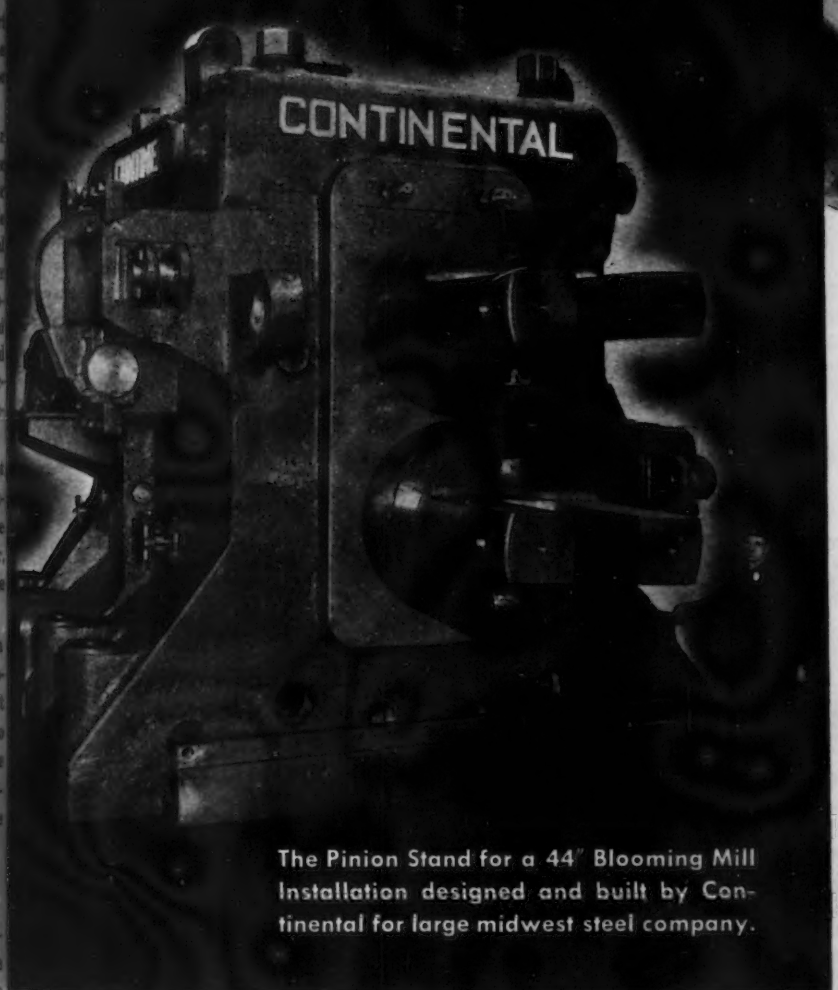
"While the standard termination article is designed essentially to provide for a negotiated settlement, it prescribes an accounting formula to be used for determination of the settlement when the contracting officer and the contractor cannot agree through negotiation.

Basis of Negotiated Settlement

"A War Department manual of accounting procedures in connection with negotiated settlements of fixed-price contracts is in process of preparation. This manual will be used by all agencies of the War Department concerned with such settlements. Close coordination is being maintained with the



FOUNDERS FOR MODERN STEEL EQUIPMENT



The Pinion Stand for a 44" Blooming Mill Installation designed and built by Continental for large midwest steel company.

ON BATTLE FRONTS all over the world the superiority of American production is destroying the might that once symbolized the power of the Axis.

Steel is doing a job, unequaled in the history of this industry. To make such production possible Continental continues to supply mills throughout America with precision products that meet today's requirements for highest speed production.

Consult Continental, one of America's largest producers of castings, rolls, rolling mill equipment and special machinery.

CONTINENTAL ROLL & STEEL FOUNDRY COMPANY
CHICAGO • PITTSBURGH



STARS HAVE BEEN ADDED *to the Army-Navy "E" pennants now flying over Continental Roll and Steel Foundry Company plants in recognition for continued high production excellence.*

CONTINENTAL ROLL & STEEL FOUNDRY COMPANY

Navy Department as the drafting of the manual proceeds.

"Because of the urgency of their situation, the Ordnance Department has published, as part of the Ordnance procurement instructions, a manual for use pending the publication of the War Department manual.

Probable Factors

"The settlement proposed by the prime contractor will ordinarily be based on the following factors:

1. His own costs to date of termination, exclusive of the cost of settling commitments to subcontractors.
2. A proportion of profit properly applicable to the uncompleted work.
3. Subcontractors claims for costs of the uncompleted portion of their subcontracts.
4. Costs incurred by the prime contractor subsequent to termination in connection with the protection of Government property and in connection with the settlement.

Contractors' Own Costs

"Although the contracting officer is not required to follow the provisions of the formula in a negotiated settlement, the formula does furnish a general guide. The formula requires a segregation of the contract costs to the date of termination between the completed portion of the contract and the uncompleted portion. It also provides that the contracting officer shall estimate the percentage of completion of the uncompleted portion of the contract for the purpose of determining a profit allowance.

"In a number of cases it will be practicable to segregate the costs between the completed and uncompleted portions. Typically this will be possible when the contract has been running for some time and accurate detailed unit cost data are available.

"**In many other** instances, however, this computation would be very difficult—typically in those cases where a new product is being made involving heavy starting load costs and the termination is effective in the earlier stages. In such cases, it is believed a satisfactory accounting guide to a negotiated fair settlement can be obtained in a simpler manner, giving results approximating in accuracy those obtainable through the exact application of the formula.

"This method, which is, of course, limited to negotiated settlements, requires the computation of only the total cost of the contract to date of termination without the necessity of attempting to segregate such costs



Acme Photo

ONE DOWN, TWO TO GO: This arrangement of ash trays is by Staff Sergeant Jerome Leige, Atlanta, Ga.

A DETROIT ELECTRIC FURNACE SPOILS THE FUN OF THE FOUNDRY GREMLINS



REDUCES METAL LOSSES. The Detroit Furnace was originally developed to conserve the nation's metal and fuel deposits. This is accomplished through fast, efficient melting with lower melting losses and the foundry use of salvage materials.





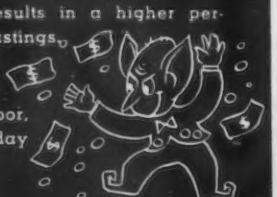
SAVES LABOR. Fast melting assures a high rate of production per man hour. No fuel to handle or store plus less dross and slag to handle for secondary metal recovery result in lower, indirect labor costs.

SAVES FLOOR SPACE. Compact, fast and efficient Detroit Furnaces give high production per unit of floor space.





REDUCES NUMBER OF REJECTS. Through accurate metallurgical control a Detroit Furnace improves metal quality and results in a higher percentage of finished perfect castings.



SAVES MONEY. Detroit Furnaces save time, labor, materials, floor-space and plant equipment. Write today for complete facts.

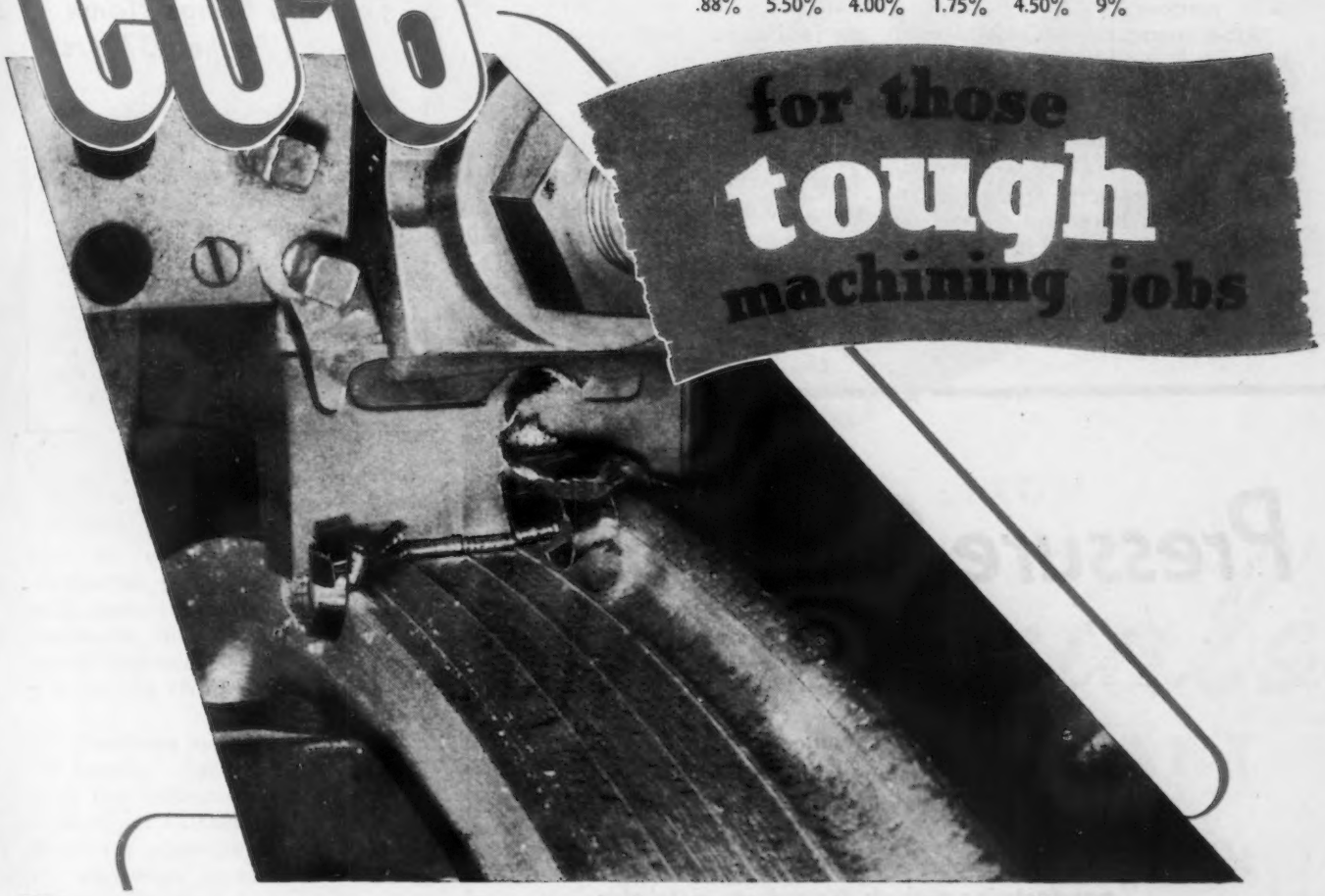
DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

CO-6

TYPICAL ANALYSIS

C	W	Cr	V	Mo	Co
.88%	5.50%	4.00%	1.75%	4.50%	9%



Resists wear and abrasion . . . increases efficiency . . . assures maximum production

In every plant there is a tough machining job where Tungsten Cobalt High Speed Steels were formerly used. Nowadays, however, they are rapidly being replaced by the Tungsten-Molybdenum-Cobalt type, such as Latrobe's CO-6, with excellent results.

You'll find that CO-6 equals, and in many cases exceeds, the performance of the 9% Cobalt Tungsten types. CO-6 is ideal for machining armor-plate, lathe beds, tank-rings, bearing races, car wheels, locomotive tires and other heavy-duty cutting applications where hardened or semi-hardened parts are involved. In ordering, unlike the Tungsten types, CO-6 need not be balanced with any other steel.

EASY TO HEAT-TREAT

Preheat at about 1450°F;

Harden at 2220° to 2260°F;

Quench in oil or air.

Double-draw at 1050°.

Heat-treating is simple. There is no danger of decarburization in hardening. CO-6 will prove tougher for many uses and provide cutting edges without any tendency to flake.

Our metallurgical staff will be glad to advise on the adaptability of CO-6, described in our new technical bulletin. Write for your copy.

LESCO
TOOL STEELS FOR VICTORY

LATROBE
ELECTRIC STEEL COMPANY

MAIN OFFICES *and* PLANT . . . LATROBE • PA.

between the completed and uncompleted portions.

"After computing the total cost of performing the contract to date of termination, the next step involves the determination of an allowance for profit. Taking into consideration all available evidence as to the percentage rate of profit, if any, which it appears would have been earned on the entire contract had it been completed, the contracting officer negotiates a fair rate of profit to be allowed in the settlement. The negotiated rate can not be higher than the rate actually indicated by the contractor's data. But where the indicated rate is so high as to lead clearly to renegotiation proceedings, taking into consideration the profit situation on all contracts, it is advisable (both from the standpoint of the Government and the contractor) to negotiate a rate which probably will not require a subsequent refund of part or all of the settlement through renegotiation proceedings.

"**The percentage** rate of profit thus negotiated is applied to the total contract cost (excluding subcontractors' claims and possibly some other exclusions under certain situations) incurred to date of termination. Thereby the amount of profit allowance is computed.

"The total costs, as previously defined, and the amount allowed for profit are added together and from this amount, is deducted the total of all payments for deliveries previously made. The balance represents the indicated equitable settlement exclusive of subcontractors' claims. To this amount is then added the amount of subcontractors' claims and the costs involved in settling such claims, as approved by the contracting officer.

"The following hypothetical computation illustrates the foregoing:

Add:		
1. Total contract costs incurred (excluding claims of subcontractors)		$1,000,000
2. Negotiated rate of profit (not in excess of indicated contract rate as determined by the contracting officers) in relation to such contract costs. For an example, this is taken at the rate of 8 per cent which is illustrative only inasmuch as the rate of negotiated profit will vary depending upon the facts of the particular case.	$80,000	$1,080,000
Deduct:		
3. Payments already made for completed and delivered units.	$600,000	
4. Payments to be made for completed units not delivered.	$50,000	$650,000
5. Indicated equitable claim for uncompleted portion of the contract before deductions for salvage and excluding subcontractors' claims.		$430,000

"If there are indications that the performance of the entire contract

Tinplate Brings Home Bacon Packed 37 Yrs.

Buffalo

• • • People who think the war's end will see tin plate on its way out should talk with Jim Harris, veteran foreman packer of a Buffalo meat concern. Recently he opened a can of Army issue bacon he packed in 1906. The can had traveled to the Philippines and back and he was hanging on to it for a souvenir. Curiosity got the better of him and when he opened the can he found the bacon as good as the day it was sealed 37 years ago.

Pressure CAN be REDUCED

There's no way of measuring how many pounds of pressure metal finishers work under, but there's no question that day in and day out the pressure is on.

Time allowances are shortened, changes in manufacturing methods demand new metal cleaners, and that puts pressure on the men in charge.

Here's a good way to reduce that pressure to normal, to keep metal cleaning costs low and results right—just keep in touch with your Wyandotte Service Representative . . . he's in touch with metal cleaning problems all the time . . . he has the resources of the whole Wyandotte organization behind him . . . and he is on call twenty-four hours a day.

In many plants the Wyandotte Service men are an important part of the metal cleaning department . . . why not call *your* Wyandotte Service Representative today?

WYANDOTTE CHEMICALS CORPORATION
J. B. Ford Division — Wyandotte, Michigan

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

* Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and the J. B. Ford Company to better serve the nation's war and post-war needs.

Now FAST DELIVERY OF ALL TYPES OF ROUND BROACHES

FROM

Colonial's NEW PLANT

ALSO *FAST* DELIVERY ON PLAIN FLAT BROACHES



In Colonial's new plant are to be found greatly increased facilities for the production of broaching machines and broaches, particularly for round and plain flat types. As a result we are currently in a position to supply all round broaches and plain flat types in a matter of weeks instead of months. And this in spite of the fact that Colonial's total volume of broaches is vastly greater than ever before and quality still higher.

1918—25TH ANNIVERSARY—1943

colonial BROACH COMPANY

Broaching Machines *Broaches-Broaching Equipment*

DETROIT . . . . . U. S. A.

would have resulted in a loss to the contractor had it been carried to completion, a suitable adjustment therefor will be made in the contractor's claim to reflect the proportionate part of the loss which applies to the completed portion of the contract.

Salvage

"Title to all of the property, the cost of which is reflected in the proposed settlement, passes to the government. If the contractor wishes to retain any part or all of such property, the contracting officer may agree with the contractor on its value and this amount is treated as a partial payment in the settlement. It is not, however, used to reduce the cost computation for the purposes of determining the amount of profit allowed.

Alternative Bases

"It is again to be emphasized that the contractor may select one of two alternative bases for stating his proposed settlement. The inventory basis —a physical inventory priced in detail or the total cost basis. It should be pointed out, however, that the inventory basis does require reliable, detailed unit-cost-data.

Allowable Costs Defined

"The importance of a fair definition of cost is obvious in determining the total cost of the contract to date of termination. While T.D. 5000 was adopted in the preponderance of cost-plus-a-fixed-fee supply contracts its use is restricted to that type of contract and it does not apply to the determination of cost in connection with fixed-price contracts.

"The cost definition in the Ordnance manual follows very closely the ordinary recognized commercial concept—including the items which a prudent manufacturer would include in his cost estimate when establishing selling prices. No provisions for contingencies, however, are allowable since at termination we are dealing with a static situation—one quite analogous to liquidation of a business.

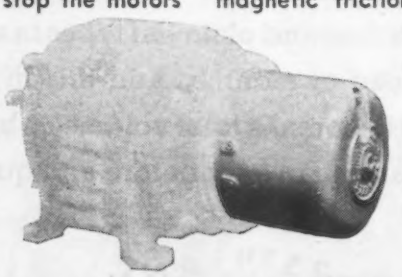
"The principles of cost determination, as stated in the Ordnance Manual are as follows:

"52.425.1 The determination of allowable costs is placed in the hands of the



Stearns Magnetic Disc Brakes are very important on the well known Besser Vibrapac concrete block making machine. The motors which actuate the vibrating mechanism have to be stopped for intervals to allow other operations.

Precious time was lost by motor coasting—time needed for producing more blocks. Stearns Magnetic Brakes now stop the motors quickly, smoothly. Result — several hundred more blocks (233% to be exact) from the Vibrapac every working hour.



Here you have one of many exacting uses for Stearns Magnetic Brakes, where their application costs so little and their usefulness is so great in a dollar and cents value to the unit they help control.

If you have a problem of automatically stopping moving machinery, why not consult Stearns Magnetic Milwaukee, pioneer magnetic friction device control experts, for expert advice.

Or—write for Bulletin 604, full of magnetic brake data.

STEARNS MAGNETIC MANUFACTURING CO.

635 S. 28th St. Milwaukee 4, Wis.

SEPARATORS—CLUTCHES—ROLLS—DRUMS—MAGNETS

POST-WAR AIRPLANE: W. B. Stout, head of Stout Research Division, Consolidated Vultee Aircraft Corp., puts the finishing touches on the model of his latest invention—the aero car or flying automobile. The three-passenger car is equipped with a removable pair of wings.

Acme Photo



for the Bridge of Ships

America's vast shipbuilding program calls for unprecedented quantities of high grade bronze castings. Bronze is the ideal alloy for the many ship parts which must resist corrosion or withstand high pressures — or both.

At the Howard bronze division, greatly expanded to meet today's need, a tremendous volume of bronze castings are being poured for use on ships of every type. Additional service is being provided for these cast parts by modern technique which increases the tensile strength of the metal.



Pressure castings for submarines are shown in the illustrations.

Bronze and brass castings for other armament applications are also being produced in great quantity, while at the two other Howard foundries an ever-growing volume of magnesium and aluminum castings is being turned out —all for the war effort. Together, these three foundries provide the largest jobbing production of nonferrous castings in America.

When you need nonferrous castings, call on Howard first.

For armament today—for utility tomorrow.

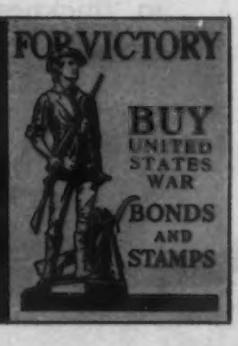
Howard Foundry Company
4900 Bloomingdale Road, Chicago

ARMY E ★ NAVY

HOWARD

ALUMINUM · BRASS · BRONZE · MAGNESIUM

CASTINGS



contracting officer in accordance with the provisions of the Article. These provisions permit the allowance of those costs incurred which are incident to and necessary for the performance of the contract, are reasonable in amount and are stated in accordance with recognized accounting practices construed and applied on such manner as in the judgment of the contracting officer will carry out the purpose of the Article. It is not intended that the contractor shall be denied compensation for any element of cost fairly allowable under the general principles set forth in the Article, because of the failure specifically to enumerate any such element in such Article or herein.

"52,425.2 For the purpose of the Article, costs may include, in addition to those directly chargeable to the contract, a proper proportion of indirect expenses or overhead.

"52,425.3 So far as found by the contracting officer properly to be allocated to the contract, there may be included in accordance with recognized accounting practices as an element of cost a reasonable allowance for depreciation at appropriate rates based on wear and tear of machinery and equipment and similar facilities, including obsolescence due to such progress in the arts and other such factors as are ordinarily given consideration in such rates.

"52,425.4 Costs of special tooling designed, purchased, or produced (including but not limited to costs of special tooling of the type of jigs, dies, fixtures, patterns and similar items) may be allowed to the extent that the contracting officer finds that such costs, in accordance with recognized accounting practices, are properly allocable to the contract.

"52,425.5 If the contractor has claimed reimbursement for the whole or any part of the cost of any machinery, equipment or other facility in excess of the allowance for depreciation as defined in OPI 52,425.3 above, because of the loss of useful value occurring during the performance of the contract or arising from the termination of the contract for the convenience of the Government, such claims determined in accordance with recognized accounting practices may be allowed to the extent that the contracting officer finds that such facility was acquired for the performance of the contract, or the contract and other contracts, and the loss of useful value has in fact clearly occurred and is properly allocable to the terminated contract and provided that the contractor agrees to protect and does protect the interest of the Government in such cases by transfer of title to the Government, by stand-by agreement or any other manner judged to be appropriate by the contracting officer.

"52,425.6 In no event shall the aggregate of the amounts allowed under OPI 52,425.4 and 52,425.5 be greater than the contract price payable if the contract had been completed, less the amount of all costs which the contracting officer estimates would have been required to perform the contract completely, excluding from costs any allowance under OPI 52,425.4 and 52,425.5.

"52,425.7 Advertising expense will not be allowed as a direct charge but a proper proportion of institutional advertising expense may be included.

"52,425.8 Experimental and research expenses may be allowed to the extent that the contracting officer finds that such expenses are applicable to the contract in accordance with recognized acounting practice.

"52,425.9 A proper proportion of franchise taxes and excise taxes, including the declared value Federal capital stock tax, but not the declared value excess profits tax, may be allowed as determined in accordance with recognized accounting practice.

"52,425.10. Accounting, legal, clerical and other expenses in connection with the discontinuance and termination of the contract and subcontracts thereto other than in connection with litigation of claims against the Government may be allowed.

"52,425.11 Without effecting the generality of the foregoing, amounts representing the following will not be allowable as elements of cost:

a. Losses on other contracts, losses from sales or exchange of capital assets, legal and accounting fees in connection with reorganizations, anti-trust litigation and prosecution of Federal income tax claims or other claims against the Government, losses on investments..

Reduction of Metals in Houses Computed

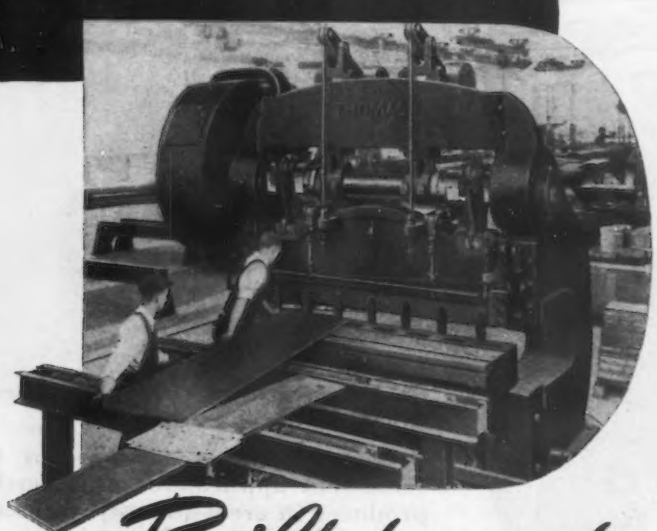
• • • Studies recently completed by the National Housing Agency show that the average privately financed family dwelling unit now being built under the war housing program consumes only 2,749 lb. of critical metals as compared with 8,930 lb. of such materials used in the average pre-war dwelling unit, a reduction of 69 per cent, the Agency reports. These statistics include not only the metals used directly in house building, but also the metals consumed in products and equipment installed in the housing and in related utility facilities such as electric, gas, water and sewage connections.

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MILL-TYPE SHEARS



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TODAY'S *production needs*

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Write for new bulletin No. 126

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.



NICKEL AIDS THE FARM IMPLEMENT INDUSTRY

to KEEP 'EM SERVING!

America won a victory on the food front in 1942 with production that reached an all-time high. But even that wasn't enough to feed a hungry, war-torn world. So this year's objectives are higher.

Farmers need mechanical equipment to produce food in winning quantities. Now, with the critical shortage of skilled farm labor, modern machinery becomes vitally important.

Agricultural equipment engineers have steadily improved farm machinery, lowered costs, and educated users. Result: no nation's farms were ever so fully mechanized as ours. And repair and service facilities have kept pace so farm equipment keeps working without excessive breakdowns or delays.

The foresight of these engineers is shown by their repeated specification of materials strengthened and toughened with Nickel. Their experience proves that a little Nickel goes a long way in the manufacture of parts that stay on the job . . . stressed parts that stand shock overloads.

From tractor transmissions to plow discs, from cylinder liners to bull gears, Nickel teams up with other metals to assure the dependable performance of farm implement parts.

For years, the technical staff of International Nickel has been privileged to cooperate with the engineers and production men who are responsible for such great achievement in the improvement of farm equipment . . . equipment now working at top speed to feed the United Nations. INCO's staff of engineers and metallurgists offers counsel and data to all who seek assistance in the selection, fabrication and heat treatment of ferrous and non-ferrous metals.

New Catalog Index

New Catalog C makes it easy for you to get Nickel literature. It gives you capsule synopses of booklets and bulletins on a wide variety of subjects—from industrial applications to metallurgical data and working instructions. Why not send for your copy of Catalog C today?



* *Nickel* *

THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall St., New York 5, N. Y.*

provision for contingencies, fines and penalties arising from failure to perform Government contracts.

b. The expense of conversion of the contractor's facilities to uses other than performance of the contract.

c. Expenses found by the contracting office to be due to the negligence or willful failure of the contractor to discontinue with reasonable promptness the incurring of expenses after the effective date of the discontinuance notice.

d. Costs found by the contracting officer to have been incurred in respect to facilities, materials or services purchased or work done in excess of the reasonable quantitative requirements of the contract after fair allowance for spoilage in manufacturing.

"The definition is sufficiently broad to be applicable to the determination of cost under subcontractors' claims to the extent that the determination of cost affects such claims. This point is very important as many contractors are at the same time both prime contractors with the Government and subcontractors to other prime contractors.

Common Material

"A factor of some importance in many cases is the problem of common material, i.e., material purchased jointly for the contract and other work. The Ordnance Manual provides that a proper proportion of the cost of such common material may be reflected in the settlement. This proportion is to be determined by computing the percentage of the indicated material requirements of the uncompleted portion of the contract at date of termination to the total requirements for such material taking into consideration all business of the contractor.

Role of Prime Contractor

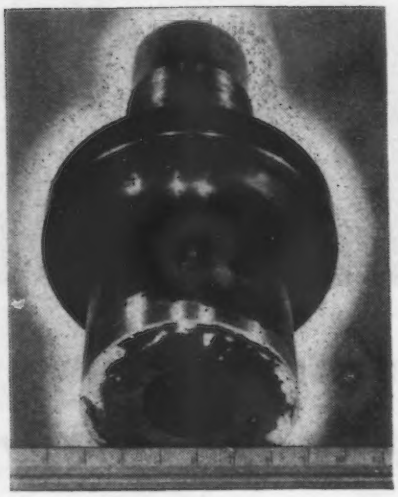
"It is the primary responsibility of the prime contractor to examine in an appropriate manner all claims of subcontractors. The problem faced by the prime contractor in passing upon the propriety of such claims is similar to the problem faced by the Government in passing upon the settlement proposal of the prime contractor. An examination of each claim to some extent is necessary but this does not infer that an audit is required in every case.

"The prime contractor, in this respect, has the responsibility to apply a standard of scrutiny to these claims which a business man would employ in the conduct of his own affairs. The Ordnance manual prescribes a certificate to be submitted by the prime contractor that he has examined, or caused to be examined, the claim of

HOW A $25.00 HARD-FACING JOB

Saved a $150.00 punch replacement!

TO HAVE REPLACED this badly worn hot upsetting punch with a new punch would have cost $150.00! It also would have necessitated an unavoidable delay in waiting until the new punch had been delivered and installed.



CLOSE-UP of Hot Upsetting Punch. Showing Coast Metals Overlay After Rough Grinding.

Again Coast Metals Hard-Facing saved the day! By building the worn punch up to its original dimensions with an extra wear-resistant coating of Coast Metals, it was made good as new. In fact, *better than new* since it will now outwear and outlast a new punch several times! All at a cost of only $25.00!

Instead of sending *your* worn parts to the scrap pile, see first whether you cannot salvage them through Coast Metals Hard-Facing. Easily applied by the electric welding arc or oxy-acetylene torch, it is equally suitable both for new and old parts of any ferrous metal.

COAST METALS, INC.

Plant and General Offices: Canton, Ohio • *Executive Offices:* New York, N.Y.

COAST METALS *hard-facing weld rods*

YOUR EQUIPMENT'S LIFE PRESERVER AGAINST WEAR

LION TAMER OUT FOR VICTORY: Miss Mabel Stark, former lion tamer with Ringling Brothers, now operates a riveting machine at the Lockheed Aircraft Plant in Burbank, Cal. She helps turn out the famous P-38 Lightning fighter planes.





Better
TOOLS and GAGES
through inspection by optical projection with Jones & Lamson COMPARATORS

THE inspection and measurement of tools, gages, production parts and products by optical projection with **Jones & Lamson Optical Comparators** has been the solution of many an inspection problem, and has resulted in better tools and gages and substantial savings in costs.

There is a **Jones & Lamson Comparator** for every need in the field of inspection by optical projection. These machines are *designed with a thorough understanding of shop practice, to meet shop requirements,* and built with all the care, accuracy and precision that so long have been the tradition of this company.

Jones & Lamson Inspection Engineers are ready to study your inspection problems and make recommendations based upon over twenty years of experience in the development of **Comparators** for inspection by optical projection.

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

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Profit-producing Machine Tools

the subcontractor to an extent considered adequate in the circumstances, that he considers the claim to be fair and reasonable and would pay the claim if reimbursement by the Government were not involved. The prime contractor, however, subjects himself to possible recourse by the Government only if he has been guilty of fraud in connection with the settlement of the claim.

"Each subcontractor who in turn has subcontracts has the primary responsibility of settling those subcontracts and has the same relative position in that respect as the prime contractor in relation to his immediate subcontractors.

"As previously mentioned, the principles of cost determination contained in the Ordnance Manual apply to the determination of costs of subcontractors claims as well as to the prime contractor's own costs.



You won't have to catch up, if you get ready now to meet the competition that will return with war's end. War Production is settling "in the groove." Your designers and engineers are beginning to emerge from the pressure of overtaking demand. The pace of bond buying has been stepped up and the spirit of free men is inspired to greater and protracted effort by the assurance that Victory can be speeded.

Full Victory will be attained only after the war has been won, by preparation for filling the pent-up and repressed needs of millions of people, here and abroad—needs that will call imperatively for satisfaction.

Manufacturers will face new tasks, new pace, the need for new productive equipment—some of it entirely new, with greater capacity, closer tolerances, more accurately controlled, with more of the characteristics that justify the expression "nearly human." . . . Such a machine may even be emerging from your mind as an embryo model.

Let FIDELITY help you incubate this model into a practical unit so you can enter the race for peace production with a running start.

Meanwhile write for our booklet, "Facilities."

Designers and Builders of Intricate, Automatic Precision Machines

ARMY E NAVY



32 YEARS' EXPERIENCE

FIDELITY MACHINE COMPANY

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Physical Inventory

"Procurement Regulations, Army Service Forces, require that the contractor be requested 'to furnish an inventory of raw material and materials in process and finished products on hand.' This physical inventory of the date of termination, including all items of which the cost has been charged to the contract, is an important record in connection with the examination of the contractor's proposed settlement. It is necessary regardless of whether the 'total cost' method or the 'inventory' method is used as the basis of the settlement. Wherever possible, the inventory should be priced in detail, even where the 'total cost' method of computing the settlement is used. Items in the inventory preferably should be segregated by classifications such as raw material, work in process, etc. All parts and subassemblies in process should be physically grouped according to condition and last labor operation performed. There should be an accurate and complete description of the units and stage of completion.

"It is very important to dispose of the inventory as rapidly as possible and in the most advantageous manner. When the contractor is willing to retain particular items on the inventory or has available some advantageous method of disposition, an inventory record of such items showing their cost and the proposed disposal prices should be submitted to the Contracting Officer. Upon his approval, the item then can be moved without waiting for the disposition of the entire inventory or the consummation of the entire settlement.

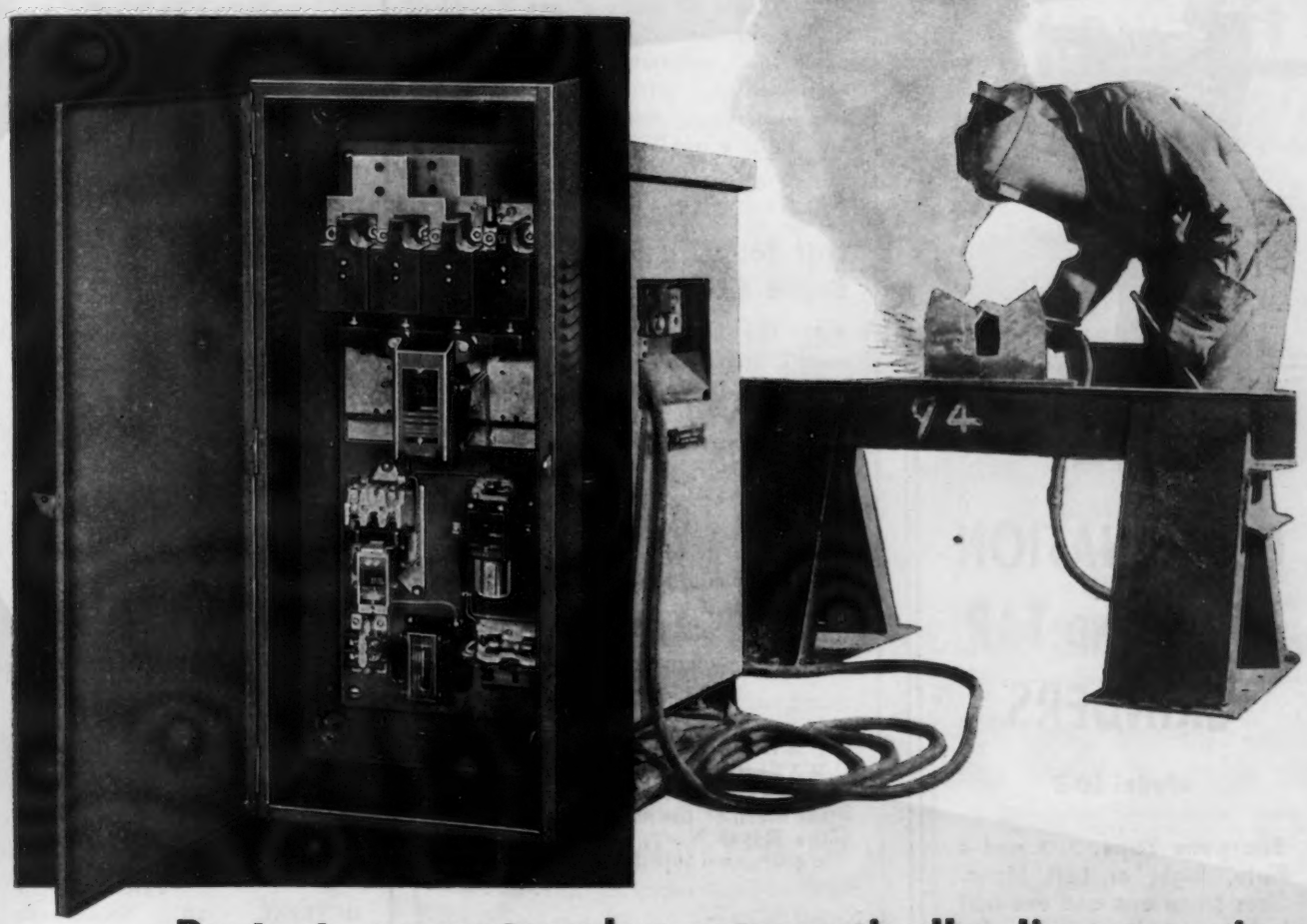
Adequate Information Needed

"The contractor can contribute a great deal to the expeditious settlement of claims by submitting adequate data with the proposal for settlement. It is necessary to make some accounting review of each contractor's settlement proposal and those settlements, both prime and subcontractors', which are supported by sufficient facts can be promptly handled.

"It is essential that the settlement proposed by the contractor be prepared on accounting bases which are susceptible to check and each element in the settlement must be supported by a reasonable amount of factual information.

"Cost systems may be excellent for control purposes and yet may be quite unsuited to the determination of costs in connection with termination of con-

SQUARE D *Announces*
SAFETY CONTROL FOR A·C· ARC WELDERS



Protects operators by automatically disconnecting welding transformer when arc is broken . . . .

HIGH open circuit voltages of A. C. arc welders (transformer type) create a definite hazard to operators. Physical contact from electrode to grounded metal surfaces (when not welding) is sometimes serious.

Square D's new class 8992 safety panels eliminate this hazard by automatically disconnecting the welder transformer after the arc is broken. The transformer is automatically reconnected the instant the operator touches the electrode to the work. Thus, the arc is struck with no delay. There is no loss in operating speed or efficiency.

There is an economy angle, too. When Square D safety panels are used, the welding transformer primary circuit is connected to the power line only while the arc is held. Substantial saving in power is effected when a number of welders are used on a single power system and the power factor is improved.

These new safety panels can be used with any make or model of A. C. transformer type arc welder. External connections are simple and internal connections of the welder need not be disturbed.

ELECTRICAL EQUIPMENT • KOLLSMAN AIRCRAFT INSTRUMENTS

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

GRAND RAPIDS



COMBINATION DRILL AND TAP GRINDERS

Model 10-B

Sharpens Taps, 2, 3 and 4 Flute, Right or Left Hand. Sizes #6 to one and one half inches.

Sharpens Drills, 2 and 3 Flute, Straight or Taper Shank. Sizes from one eighth to one and one half inches.

"Sharp Drills and Taps Cut Holes in Rising Production Costs."

Other Combinations Also Available

•

Write for complete descriptive literature

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tracts. Without destroying the value of such systems they can no doubt me modified and it is recommended that surveys be made promptly to ascertain the changes necessary.

"It should be realized that a much higher standard of care and accuracy applies to statements prepared for the settlement of terminations than to cost statements prepared for internal and routine use."

Last Basic Magnesium Unit Begins Production

• • • The last unit of the government's huge Basic Magnesium, Inc., plant at Las Vegas, Nev., went into operation on July 12. Like the proposed aircraft carrier "Shangri-La," this plant cost the government $130,000,000. The equivalent of a dollar contribution from each person has greatly increased United States magnesium capacity since it is understood that output from this plant will be three times more than from all similar plants combined.

GUARDIANS OF BRITISH WATERS: Mines move along the slipway at a regulated pace toward the stern of the ship, a minelayer of the Royal Navy, from which they are dropped into the water.

Acme Photo



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Now published in the United States. . . . An opportunity for technical and scientific workers, libraries, educators, and others.

We have been licensed by the U. S. Alien Property Custodian to publish 53 war-important German titles, in the fields of chemistry, chemical engineering, metallurgy, meterology, physics, etc. All are outstanding works, hitherto available only in the imported editions. Since small editions only are being published, you are urged to order as promptly as possible.

Included in the 53 titles are the following:

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Prices are f.o.b. Ann Arbor, Michigan; 2% discount for cash with order. Circular describing the 53 titles in detail will be mailed on request.

EDWARDS BROS., INC.
Lithoprinters
Ann Arbor, Mich.

Ordnance District Makes Postwar Plans

Chicago

• • • **The Chicago Ordnance District** is taking steps to smooth the conversion of industry in this area back to peacetime production. H. P. Isham, ordnance executive, has been appointed chief of purchasing, termination and renegotiation policy. Mr. Isham will be assisted by Lt. Col. F. W. Parker, Jr.

In announcing the appointment of Mr. Isham, Brig. Gen. T. S. Hammond, district chief, said, "Terminations of contracts are certain to become increasingly important when the war effort passes its peak and we are determined that such terminations shall be handled promptly and fairly. Already the Chicago district has completed termination of 90 contracts."

Col. Parker, assistant chief of the new department, pointed out that more and more terminations can be expected, that is, terminations of uncompleted contracts because the commodity is obsolete or because there is too much of it, or for any one of a dozen reasons all due to what is called the "fluidity of war." Efficient handling of these terminations, Col. Parker said, will contribute much to giving the nation a good start on resuming normal operations in peacetime.

The ordnance district has prepared a manual covering contract termination which is intended to serve as a guide for companies faced with termination of contracts. It was pointed out that these steps are being taken as matters of foresight since ordnance production in this area is still increasing and some 3338 contracts valued at $3,696,248,799 are still being administered by the district.

Hammersley Named to Head Consumer Division

Washington

• • • **William E. Hammersley**, formerly with the New Jersey Zinc Co., New York, and the Reynolds Metals Co., Harrison, N. J., has been appointed as director of the WPB Consumers' Goods Division. Mr. Hammersley was deputy director of the division. He succeeds Dudley P. Felt, who has returned to private business in New York. **Robert Beatty**, previously Chief of Section 1 in the division, has taken over the post of deputy director.



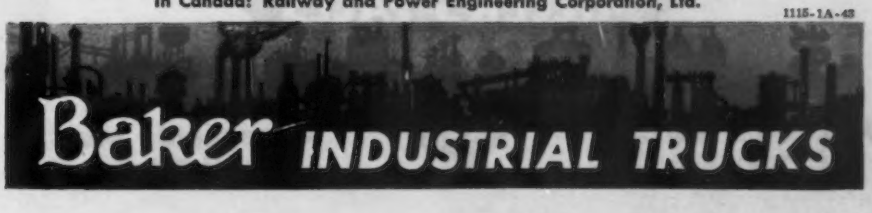
For Increased Production and Efficiency

Another forward step in providing faster, safer, and better movement of material has been made by Baker Trucks. This new Low-Lift model, designated as Type E-3, is of 6000 lb. capacity. The improvements consist of hydraulic lift, increased battery capacity permitting longer continuous operation, chamfered front top corner of battery compartment improving driver's visibility, operator's guard integral with frame for greater strength and safety, and other features which provide increased efficiency and easier maintenance ... The new improved design is also available in 4000 lb. capacity (Type E-2). Write for complete information.

NEW Baker Low-Lift Truck has these advantages:

1. Hydraulic lift system proved by experience in other Baker Trucks, providing positive control of hoisting and lowering.
2. Larger battery box (32" x 39½") permitting enough additional battery capacity so that trucks can be operated continuously for longer shifts.
3. Streamlined design of battery compartment providing greater visibility for operator.
4. Sliding type battery cover equipped with handles for faster servicing.
5. Operator's guard built integral with frame for greater strength and safety and improved appearance.
6. Handy compartment for carrying towing chain, pinch bar, or other tools.
7. Controls in a conveniently accessible panel providing easy maintenance.
8. Alloy-steel trailing axle firmly anchored to frame, wheels steering on anti-friction bearings. Box-section frame to withstand strains and minimize maintenance.
9. Single hex nut for adjusting travel brake located where it can be easily reached.
10. Standard Baker-built travel motor, and exclusive Baker Duplex-Compensating Suspension for smoother running and longer life.

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1115-1A-43



Briefly Told— Back to Aluminum Go C-76 Cargo Planes; Other Industry News

• Back to the use of aluminum in order to conserve wood! This appears to be the decision of the War Department in announcing the cancellation of contracts for the manufacture of the C-76 cargo plane by the Curtiss Wright Co. and the Higgins Co. It is believed around $400,000,000 worth of work is involved. The action is similar to that taken in certain construction projects where steel was ordered as a substitute for lumber, which had been designated as a substitute for steel, if you can follow us.

•

• How is war production proceeding? Here are some reports from industry. Production by General Motors for the second quarter of 1943 reached a new high of $832,275,349 as measured in dollar volume of deliveries, an increase of 8.7 per cent over the first quarter of this year. Dollar volume of production of aircraft engines by the Lycoming Division of Aviation Corp. during the first half of 1943 showed a gain of 32 per cent over the output for the corresponding period of last year. Production for the first six months of 1943 by the two Detroit plants of Republic Aircraft Products division of Aviation Corp., increased more than 25 per cent over production for the last half of 1942 and was almost double the output of the first half of 1942. Order backlogs on June 30 were three times the backlog of 12 months prior.

•

• *The War Production Foundry Congress of the American Foundrymen's Association is going to Buffalo, N. Y., next year. It will be held the week of April 25 in Buffalo's new Memorial Auditorium.*

•

• The Cleveland Automatic Machine Co. has added a line of high pressure, hydraulic die-casting machines, with the purchase of the G. & N. Mfg. Co., Cleveland. The take-over has been worked out so that both manufacture and sales of the die casters will be switched to the Camco plant without interruption.

•

• Office swivel chairs of 450 members of the Associated Industries of Massachusetts were empty July 30 while the men worked out as soldiers at Camp Edwards. Despite aching muscles they returned enthusiastic over Army equipment.

•

• Use of a moving conveyor has speeded X-ray inspection of airplane castings. A rate has been achieved as high as 17,000 per 24 hr. day, according to C. V. Aggers of Westinghouse Electric & Mfg. Co.

•

• *Japan claims that the output of light metals from Manchukuo and North China has been greatly increased, rendering Japan largely independent of imports. Reserves of 25 to 55 per cent alumina in North China are claimed to be over 25 million tons.*

•

• The hull of the new destroyer escort ship—deadly answer to submarines—is put together in 13 "doughnuts" or prefabricated sections, some of which weigh 84,000 lb. Production is being rushed in about a dozen privately operated shipyards. The vessel is about 300 ft. long, with 36 ft. beam. It carries topedo tubes, depth charges and heavy machine guns. The multi-purpose main battery is declared to be equally destructive against enemy planes or subs.

•

• A break-down of alien patents has been prepared by Origination, Inc., Wrigley Bldg., Chicago. The list has been segregated into 300 portfolios. Any one such portfolio may be purchased from Origination, Inc., for $150.

•

• In an effort to improve the quality and quantity of shipyard welding work, the U. S. Maritime Commission announced July 30 it had accepted the offer of the Lincoln Electric Co. to train and instruct welders. The company will furnish training facilities in Cleveland.

•

• To expedite the outfitting of escort vessels, the Canadian Department of Munitions and Supply is extending the facilities of the Toronto Shipbuilding Co., Ltd., by establishing an outfitting yard in Hamilton harbor.

•

• Lt. Col. William J. Rushton, Birmingham insurance company executive, has been named deputy chief of the Birmingham Ordnance District which includes the states of Alabama, Mississippi, Louisiana, Georgia and Florida.

•

• Allied engineers in the front line of invading troops are using an additional $75,000,000 worth of tractors, cranes, and other construction machinery as a result of steps taken by WPB to enlist such peacetime equipment in war work.

•

• *Hydraulic Institute, New York, trade association of pump manufacturers, has completely revised the test code section of its standards.*

•

• Deaf-mute war workers producing portable emergency landing mats for the air forces at the western division of the Irving Subway Grating Co. in Oakland.

A NAME WORTH LOOKING FOR when you need quality tools

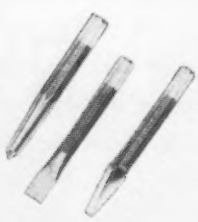


THE NORMAL Millers Falls line includes hack saw frames in 18 models, each with its special features of serviceability, convenience, and economy. "Best of all breeds" for most tool users is No. 48 (illustrated), a higher-quality frame of unusual excellence in design, ruggedness, and value. Rigid; fine balance; polished and buffed finish; comfortable checked Lumarith unbreakable handle. Adjustable for 8 to 12 in. blades.



IDEAL companion for No. 48 is Tuf-Flex, the most efficient and economical general-purpose hand saw blade ever developed. Won't break, won't strip. Bites cleanly through tough rods or thin tubing. A good example of what we mean by "Millers Falls *Quality*."

STANDARD items of excellent reputation in the normal Millers Falls line are 52 sizes and styles of cold chisels and punches, hammer-forged of high grade steel selected for its extreme toughness. Superior heat treating—a Millers Falls specialty—makes these items uniformly the finest quality. Look for the Millers Falls name when you buy, you'll decide the results are *worth* extra care in selection.

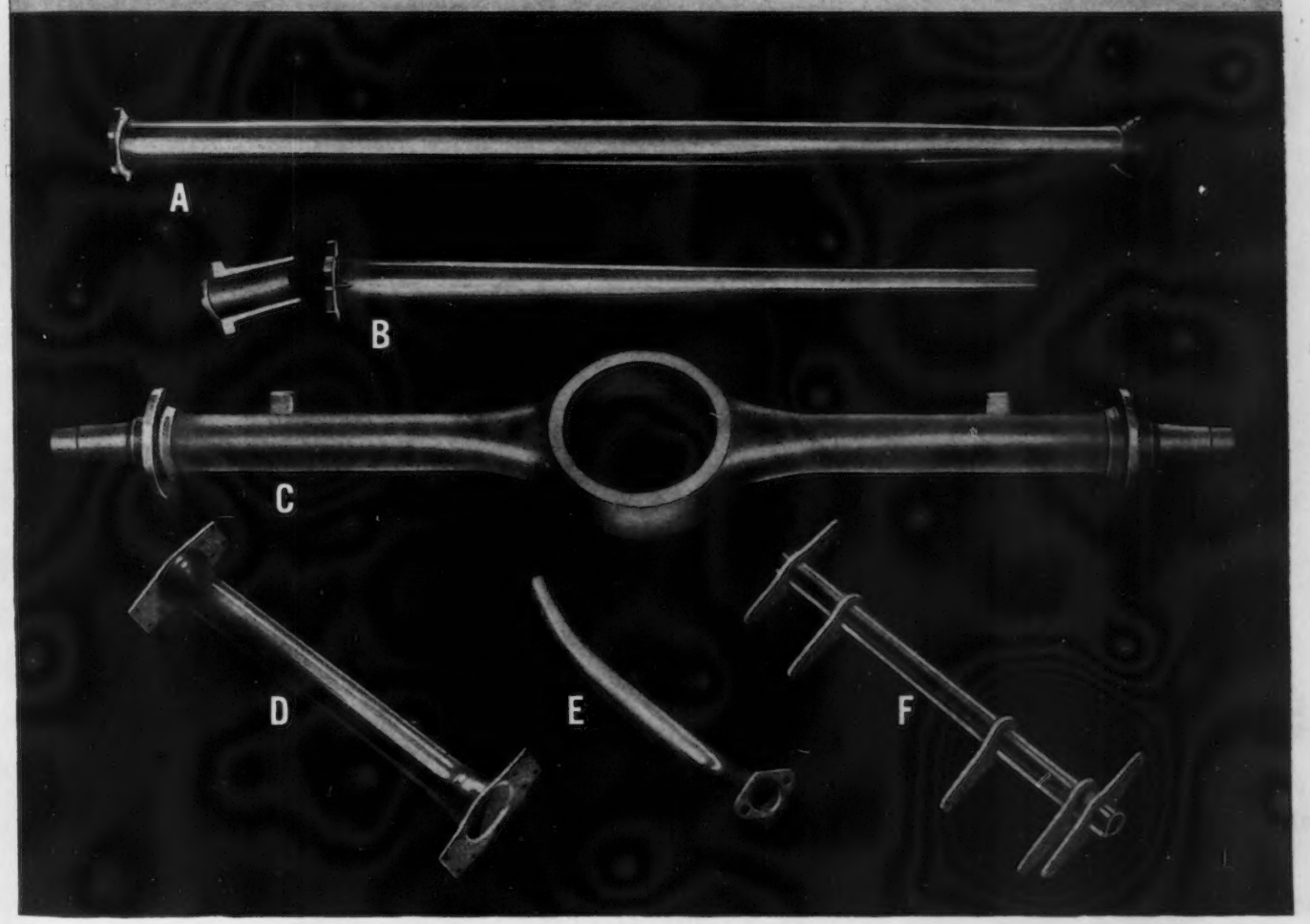


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AMERICAN METAL PRODUCTS COMPANY

Manufacturers of Welded Steel Tube, Tubular Parts and Assemblies for the Transportation Industry



DESCRIPTION OF PARTS: A—One Piece Torque Tube. B—Torque Tube. C—Rear Axle Housing. D—Frame Rear Cross Tube. E—Spare Wheel Carrier Arm. F—Brake Cross Shaft.

We are serving transportation manufacturers in war, as in peace, with quantity produced welded-steel tubular parts made by the hot and cold process . . . upsetting, forming, swaging, forging, welding, heat treating and machining.

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Calif., are at least 25 per cent and possibly 35 per cent more efficient than average workers not so handicapped, the company says.

●

• Walter Geist, Allis-Chalmers president, entertained two notable South American visitors at a dinner in the plant's club house recently, Senor Don Rudole Michels, ambassador from Chile, and Senor Pedro Alvarez, executive vice-president of the Chilean Nitrate & Iodine Corp., former minister of commerce and economics in Chile. Senor Michels reported that Chile is sending 600,000 tons of metallic copper, not ore, to the United States every year where previously his country shipped 100,000 tons annually to England and Germany.

●

• **Records of the commission for apprenticeship in industry for the state of Wisconsin reveal that 4162 youths, mostly in the 16 and 17-year brackets are being trained.**

●

• *With $26,440,000 in factory expansions authorized in Chicago in July, Chicago's industrial facilities have been increased by $110,329,937 since the start of 1943, according to the Chicago Association of Commerce. Total investment in factory buildings and equipment in the Chicago area since the opening of the war production program in 1940, has now reached $928,984,937.*

●

• Construction of two 20,000 hp. electric motors for the Army's new stratosphere wind tunnel at Wright Field has been started by Westinghouse.

●

• America's new anti-tank weapon, the "bazooka," described as something that might have come out of a highly imaginative comic strip, has been in mass production at one of the General Electric plants for about a year, company officials recently announced.

●

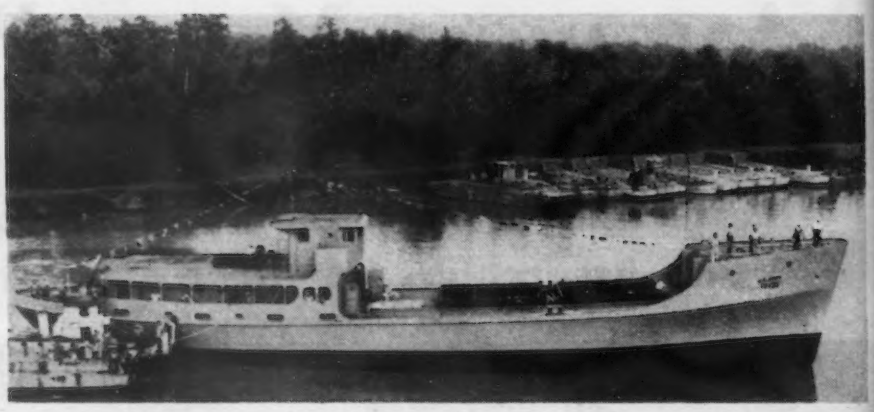
• Of a total of $7.5 billion war contracts placed during March, the State of New York received $1 billion, the largest amount awarded any state, according to the National Industrial Conference Board. Total contracts awarded during the month were slightly more than 50 per cent above the monthly average for the three months immediately preceding. Second to New York came Ohio with $703 million. Illinois with $681 million was third. Contracts awarded New York were primarily for ordnance items. Ohio led all the states in new orders for aircraft. California received more than half of the total $600 million ship contracts let for the month.

●

• **Republic Steel Corp. soon will start work in Buffalo on a two-story building to house the plant dispensary, employment office and timeclock office. The job will cost approximately $45,000.**

●

A so-called informer's suit seeking $2,000,000 damages from the Bechtel-McCone Parsons Corp. for alleged frauds in connection with War Department contracts has been filed in Federal District Court in Birmingham. The civil action, filed under a statute enacted in 1863, charges the corporation with gross negligence in administering its government contracts. John A. McCone, president of the concern, declared the charges were false.



Acme Photo

FIRST OF A HUNDRED: First off the production line of the Higgins Industries, Inc., New Orleans, is this small Army cargo ship, the FP-135. One hundred of these small freighters are under construction.

Here's Safe Easy Strength... FOR THE WEAKER SEX



The Conco Torpedo Electric Hoist has many features which adapt it ideally to operation by women. First, push button control allows for easy, one-hand operation. Double cast iron drums balance the load with a minimum of effort from the operator. An electric brake and positive limit switch are important safety features. Available for prompt delivery in 250-, 500- and 1000-lb. capacities for hook, bolt or trolley suspension. Write for bulletins.



Illustrating four units of Conco's complete line of hand - powered and electric cranes, hoists and trolleys. Write for bulletins on the equipment needed.

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Another "FIRST" by Sav-way!



147 PLUGS—
4 HANDLES—
IN PLASTIC CASE

Complete Master Set of Standard Plug Gages

For the first time—a complete Master Set of standard plug gages for hole inspection, including 147 plugs and 4 handles. Plugs are set in increments of 1/64ths, starting at 1/4" and going to 1". There are three plugs of each nominal size—.0005 over, standard, and .0005 under.

All plugs are deep-frozen before finish grinding to relieve internal strain and provide accelerated aging, and are held to gage makers' (X) tolerance, lap finish.

The plastic case has a transparent cover which presents a clear view of the contents and instantly indicates a missing plug.

Sav-Way Plug Gages are produced by skilled gage makers; they have been proven in actual use on aircraft and ordnance parts of the highest accuracy.

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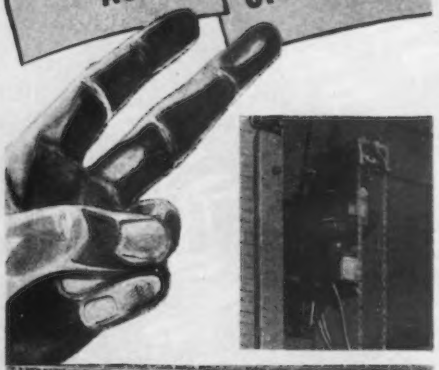
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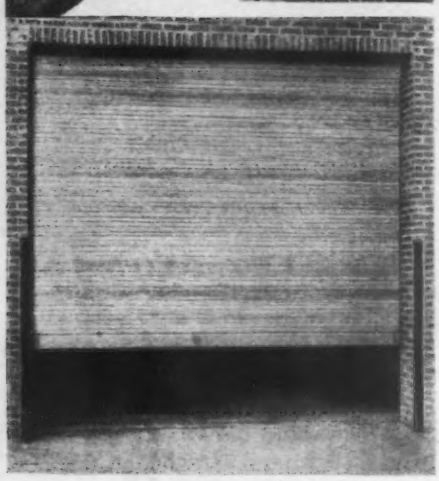
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COILING UPWARD ACTION

MOTOR OPERATION





KINNEAR WOOD ROLLING DOORS

Kinnear *Motor Operated* Wood Rolling Doors can be opened or closed quickly at the touch of a button — from any convenient location! The rugged, heavy-duty motor does the work, saves valuable time and labor.

And coiling, upward action saves valuable floor, wall and ceiling space. The doors stay out of the way when open, safe from wind or traffic damage.

Strong inter-lapping wood slats form a rugged curtain that blocks out wind and weather, yet presents a neat appearance.

Kinnear Wood Rolling Doors also assure highest economy of war-vital metals!

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Saving Ways in Doorways

KINNEAR ROLLING DOORS

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(CONCLUDED FROM PAGE 89)

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PERSONAL

To Executives Placing War Sub-Contracts

Here's one of the largest wood-working plants in the country, looking for War work. *We have lumber on hand*—and facilities to fulfill even the very largest Contracts or Sub-Contracts.

Mass production operations are an old story to us. We're equipped to do drying, machining, boring, assembling and finishing on a large scale. And we're centrally located in Cincinnati, a most strategic shipping point.

Our scores of machines and hundreds of skilled workmen need to be kept busy. Our experience can be put to profitable use in the prosecution of the War. If any part of *your* War work involves the use of wood or wood products on a large scale, we would like to quote you on weekly or monthly repeating orders. Maybe we can even help you find a way to make wood take the place of some more vital material in your product!

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Uncle Sam's new ocean-going terriers hunt underwater rats in any weather!

Remember the SC's, those doughty little sub-chasers that knocked out 40 per cent of all the German U-Boats we sunk in World War I?

For *this* war your Uncle Sam has something even deadlier! It's the PCE—a Patrol Craft Escort. Able to take the toughest pounding that angry seas can offer, faster, more maneuverable and better armed than their predecessors, the Navy's new PCE boats will soon be proving their worth in convoy and patrol duty—in sighting subs and *sinking same!*

To see that we get enough of these craft —*in time,* The Pullman-Standard Car Manufacturing Company became a shipbuilder. And Pullman-Standard, like most veteran shipbuilders, depends on modern DeVilbiss Spray Painting Equipment—not only to "speed 'em through," but to give each boat the hard, tight finish needed to withstand the paint-destroying rigors of salty, sea-going service.

Whatever war materiel you are making —be it bullets or battleships—if you want painting or coating operations in your plant to move with the greatest possible speed and efficiency . . . call a DeVilbiss engineer.



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SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS

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HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

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has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

•

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT



Trade Notes . . .

Hanchett Mfg. Co. and the Covel-Hanchett Co. of Big Rapids, Mich., have purchased from the Covel Mfg. Co., Benton Harbor, Mich., the entire line of saw and knife fitting machinery manufactured by Covel.

•

Mercantile Metals, Inc., will be operated by the Carnegie Co., Pittsburgh, starting July 1. There will be no change in personnel.

•

Sample-Durick Co., Indian Orchard, Mass., purchased the former Coburn Trolley Track Co. plant.

•

Sam Tour & Co., Inc., with main offices at 65 Pine Street, and laboratories at 45 Fulton Street, New York, will specialize in the metallurgical, chemical and process engineering fields. The laboratories of the new company were formerly part of Lucius Pitkin, Inc., New York.

•

Stolper Steel Products Co., Milwaukee, has purchased an office building and a three-storied mill construction plant formerly owned and operated by the Wisconsin Furniture Co.

•

Chain Belt Co. erected a new research and maintenance building at its West Milwaukee plant.

•

Acme Machine & Tool Co., 710 N. Plankinton Ave., has been organized by Jack Kader, I. V. Brossel and C. Brossel.

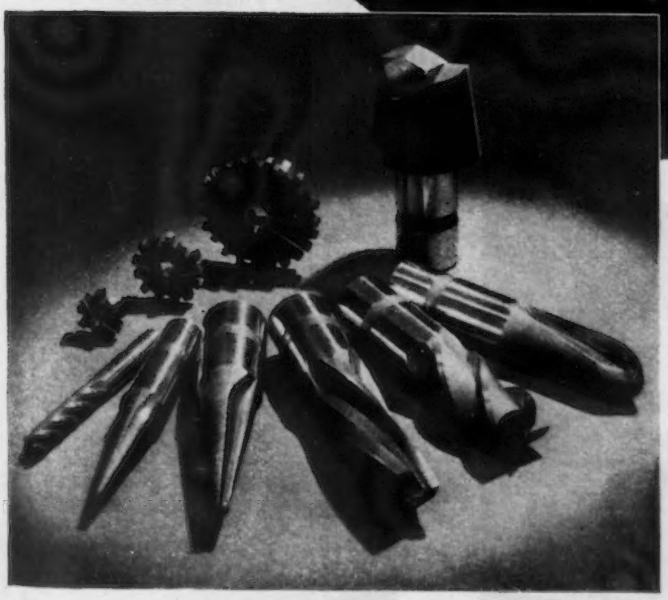
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Sherwin-Williams Co. is planning the construction of two new paint plants, one in Mexico City, Mexico, and the other in Sao Paulo, Brazil, according to George A. Martin, chairman of the board. Mr. Martin disclosed that actual work on the new projects which are to cost approximately $1,000,000 would commence as soon as construction materials are available—probably not before the close of the war.

•

Lempco Products, Inc., Bedford, Ohio, has purchased the Evans Flexible Reamer Co., 4541 Ravenswood Avenue, Chicago. The name of the company has been changed to Evans Reamer & Machine Co., with James F. Strnad president of the new corporation.





T-J DIE SINKING MILLING CUTTERS meet today's production requirements for speed and accuracy with *more work between grinds!*

Long years of T-J leadership in this field make T-J Cutters "tops" in design, sturdiness, ability to hold a sharp edge and carry less breakage percentage. T-J Cutters are made from a standard, extremely high grade steel... assuring extra strength, wear resistance and uniformity. Send for new catalog.
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FOR TOUGH JOBS... SPECIFY T-J

TOMKINS-JOHNSON

DIE SINKING MILLING CUTTERS

PERSONALS

• **C. L. Huston, Jr.**, has been elected president of Lukenweld, Inc., Coatesville, Pa. He succeeds **Everett Chapman** who has resigned. Mr. Huston, formerly with the American Rolling Mill Co., Middletown, Ohio, became director of personnel relations for Lukens and its subsidiaries in 1939. He recently served as a special mediating officer of the WLB.

• **Paul M. Dollard**, formerly secretary-treasurer of Adel Precision Products Corp., Burbank, Cal., has been elected executive vice-president and secretary of that corporation. **Svend Amdisen**, former assistant treasurer, has been appointed treasurer. **Robert Cavanaugh** has been elected vice-president in charge of finance. **Harold P. Wade**, previously plant manager, has been appointed sales manager. **Guy Hollister**, former manager of outside production, has been made manager of hydraulics production, and **Charles Spurlock** succeeds him as manager of outside production. **L. J. Madden** has been appointed tooling department superintendent.

• **Charles A. Dostal** and **Fred T. Whiting** have both been appointed vice-presidents of Westinghouse Electric & Mfg. Co., Pittsburgh. Mr. Dostal has been Pacific Coast district manager for Westinghouse since 1939. He has been with the company for 37 years. Mr. Whiting joined Westinghouse in 1915, and has been manager of the company's Northwestern district since 1930.



C. L. HUSTON, JR., president of Lukenweld, Inc., Coatesville, Pa.

• **H. H. Benfield** has been appointed eastern division manager of Bulldog Electric Products Co., Detroit. Mr. Benfield was formerly New York district manager for Bulldog. Prior to joining the company he was sales manager of the Steel & Tubes Division of Republic Steel Co.

• **W. F. Armstrong** has been named special assistant to Albert Bradley, executive vice-president of General Motors Corp. Mr. Armstrong returns to the company after six years as vice-president of Nash-Kelvinator Corp.

• **Frank R. Pierce** has been appointed head of the Detroit office of General Motors Corp. Previously, Mr. Pierce was vice-president in charge of sales for the Nash-Kelvinator Corp.

• **John B. Lawson** has been elected vice-president of the Ferracute Machine Co., Bridgeton, N. J. He joined the company in 1941 as controller. **H. B. Harrison** has been appointed general sales manager of the company. He was formerly sales engineer for the Bucyrus Co., Milwaukee.

• **Robert F. Willey** has been appointed manager of sales of Bethlehem Steel Co.'s Washington office. He succeeds the late Mr. E. R. Leonard. Mr. Willey joined Bethlehem in 1927. He became a member of the sales staff at the Baltimore office in 1935, and has been with the Washington office since 1942.

• **Gordon Cole** has been appointed to the newly created position of director of advertising of the Can Manufacturers Institute, Inc.

• **R. E. Kennedy** has been elected secretary and executive vice-president of the American Foundrymen's Association. Other officers elected are: **C. E. Hoyt**, treasurer; **N. F. Hindle**, as-



CHARLES A. DOSTAL, vice-president of Westinghouse Electric & Mfg. Co., Pittsburgh.



FRED T. WHITING, vice-president of Westinghouse Electric & Mfg. Co., Pittsburgh.



PAUL M. DOLLARD, executive vice-president, Adel Precision Products Corp., Burbank, Cal.

sistant secretary; **W. W. Maloney**, staff assistant, and **J. Reininga**, assistant treasurer.

• **Richard E. Johnson**, former assistant superintendent of the Cedar Rapids division, Rock Island Lines, has been appointed superintendent of the Joint Texas division, operated by the Rock Island, Fort Worth and Denver City Railway Co., and also superintendent of the Burlington-Rock Island Railroad Co.

• **Millar Brainard** has been elected president of the newly acquired G & N Mfg. Division of the Cleveland Automatic Machine Co. **George A. Collier**, director of sales of the Camco plant of the Cleveland company, has been made general sales manager of the combined divisions. **G. V. Patrick** has been made executive vice-president. **James Hammond**, president of the Camco plant, has been appointed treasurer of the new division.

• **William M. Rand**, vice-president of Monsanto Chemical Co., St. Louis, was elected to the executive committee of the company. **Daniel S. Dinsmoor**, former assistant general manager of the organic chemicals division, has been elected a vice-president of the company. **Julius A. Berninghaus**, general manager of the organic chemicals division, will retire in November. **Osborne Benzanson**, vice-president of the company and general manager of the Texas Division, will succeed Mr. Berninghaus as general manager of the organic chemicals division



MILLAR BRAINARD, president of G & N Mfg. Co. Division of Cleveland Automatic Machine Co.

• **Jones Cahill**, former open hearth superintendent for Republic Steel Corp. at Youngstown, has been appointed open hearth superintendent at the corporation's Gadsden, Ala., plant.

• **Ralph William Ebbott**, Fort Atkinson, Wis., formerly with the WPB at Madison, Wis., has been appointed district manager at Madison for the SWPC.

• **Fred M. Young**, president and general manager of the Young Radiator Co., Racine, has been appointed vice-president and a member of the board of directors of the Western Metals Specialty Co., Milwaukee.

• **R. H. Hathaway**, formerly assistant chief engineer for Hammond Machinery Builders, has joined the Packer Machine Co., Meriden, Conn., as sales and service engineer.

• **L. A. Brown** has been appointed vice-president in charge of manufacturing of Landers, Frary & Clark Co., New Britain, Conn. He was formerly works manager for Universal's lower plant.

• **Hudson W. Reed**, Jr., has been made director of personnel and safety of American Welding & Mfg. Co., Warren, Ohio. **Wallace W. Leipner** has been made acting chief engineer for the company.

• **Roy A. Peterson** has been appointed manager of purchases of United States Steel Supply Co. Mr. Peterson joined U. S. Steel in 1923 as stock clerk.

• **J. B. Peake**, formerly New York district sales manager of Mathieson Alkali Works, Inc., has been made assistant general manager of sales.

OBITUARY...

• **Col. Leonard S. Horner**, former president of Niles-Bement-Pond Co., died recently. Col. Horner began his career as an electrical engineer for American Telephone & Telegraph Co. in 1898. During World War I he was chief of staff of the Bureau of Aircraft Production, and later became sales manager and vice-president of the Acme Wire Co. More recently he was adviser to the Special War Industries Section of the Builders' Hardware Statistical Association.

• **Conrad N. Lauer**, chairman of the board of the Philadelphia Gas Works Co. and former vice-president and treasurer of Day & Zimmerman, died recently. He was 73 years of age.

• **William L. Latta** died recently in Wheeling, W. Va. Mr. Latta was manager of the galvanized sheet sales division of Wheeling Steel Corp. He was 68 years of age.

• **Standish Backus, Sr.**, who retired this year as president of Burroughs Adding Machine Co., died July 13. Mr. Backus was at one time secretary of General Motors Corp.

• **Zechariah Chafee**, president of the Builders Iron Foundry, Providence, R. I., died July 8. He was 85 years of age.

• **Earl F. Glover**, president of Air Cruisers, Inc., Clifton, N. J., died recently.

• **George A. Mohr**, vice-president of the Boye & Emmes Machine Tool Co., died July 31 in Cincinnati.

• **Louis Hyman** died July 15 in Philadelphia. He was connected with Joseph Hyman & Sons, Philadelphia.

• **Howard F. Gordon**, safety engineer for the General Electric Co., Lynn, Mass., since 1925, died July 26. He was 40 years of age.

• **George W. Long**, vice-president of Simmons Machine Tool Corp., Albany, N. Y., was drowned while canoeing on Lake George on July 22. He was 51 years old and a member of the firm for over 30 years.

• **John McCullough**, a civil engineer for the state of Wisconsin and former city engineer for the city of Fond du Lac, Wis., died recently in Milwaukee. He was 71 years of age.

• **Peter J. Lavies**, former president of the P. J. Lavies Sheet Metal Contracting Co. at Milwaukee until it was dissolved several years ago, died recently.

• **William E. Doll**, for 16 years sales-manager of the Worthington Pump & Machinery Co. at St. Louis and Detroit, and for the past 12 years president of Gustavo Preston Co., Boston, died July 22.

MACHINE TOOLS

. . . News and Market Activities

Used Tool Case Decided; U. S. to Collect

Washington

• • • **Government officials** in war agencies were put on notice last week by a novel decision of the District of Columbia Federal Court that the government can be defrauded whenever an employee violates established government procedures and consequent government rights. The government had no money interest involved.

The court decided that Robert B. Rhoads and Ralph L. Glaser, salaried employees of the government, were guilty of a criminal conspiracy to defraud the United States, when, acting as chief and assistant chief of the WPB used tool section, they bought and sold used tools. Judge Bolitha J. Laws handed down the opinion.

The tools were owned by Louis E. Emerman Co. of Chicago. The government officials were said to have bought an option and sold the tools to two private purchasers, Clarence J. O'Brien and Frank L. O'Brien of Philadelphia. The government was defrauded, the court said, when the used tools sections established procedure in cooperation with the Army and Navy Munitions Board to decide after investigation which concern needed them most was violated through the sale of the tools to individual purchasers without offering them to the trade generally.

The Government expects to collect $55,000 in fines in a case where it did not participate in the transaction, to be paid as follows: Robert B. Rhoads and Ralph L. Glaser, $10,000 each, $5000 additional each for the submission of fraudulent travel vouchers; Louis E. Emerman, $10,000; and Clarence J. and Frank L. O'Brien, $7500 each. Robert B. Rhoads and Ralph L. Glaser were both given prison sentences of six to 18 months but placed on probation.

The defendants were prosecuted under section 88 of the criminal code.

Judge Laws in a statement from the bench said:

"I do not find that the war work was impeded by the acts of the defendants. It is claimed and appears possible, that in point of fact, the used tools in this case got into the possession of concerns needing them more promptly than if the deals had been made through other parties. I am convinced that Emerman sold the tools for the price he wanted for them, and at a fair market value. No showing has been made that either Rhoads or Glaser would be able to do Emerman a favor, since the indictment includes no charge to this effect, it would be unjust to deal in any speculation in this regard.

"What seems to me to be grievous is that government officials should make a substantial profit in connection with products with which they were dealing as agents of the government. It is possible Emerman might have sold the used tools to Rhoads and Glaser whether they had been in the government or not. But the transactions in this case had inherent in them the tendency to lead Rhoads and Glaser to become more concerned in making a profit for themselves than in getting the tools into the hands of parties which critically needed them."

Judge Laws pointed out that the reason for his leniency in not sentencing to prison Clarence J. and Frank L. O'Brien was that they were advised by "competent counsel" that "there is no law directly prohibiting government officials from engaging in private business transactions and since Rhoads and Glaser were buying the tools at their fair market value with no promise of favor, there would be no wrong committed either legal or moral." Mr. Rhoads was also persuaded to the view of lawyers for the O'Briens, the court found, although he had at least one attorney tell him that he thought it was illegal. The reason Mr. Glaser was not sentenced to prison was that the judge said there was not sufficient difference in the participation in the crime between the two government officials to make a difference in sentencing them.

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Reports of Idleness Examined

Cleveland

• • • **There are persistent** reports in the Cleveland area that manufacturing plants, notably those of machine tool builders, are vastly overmanned. These charges, apparently coming from the workers themselves, brought a sharp rebuke from the district office of the War Manpower Commission. The charges are to the effect that, while workers are paid full time, there is not enough work to keep them busy and manufacturers will not give them a work-release.

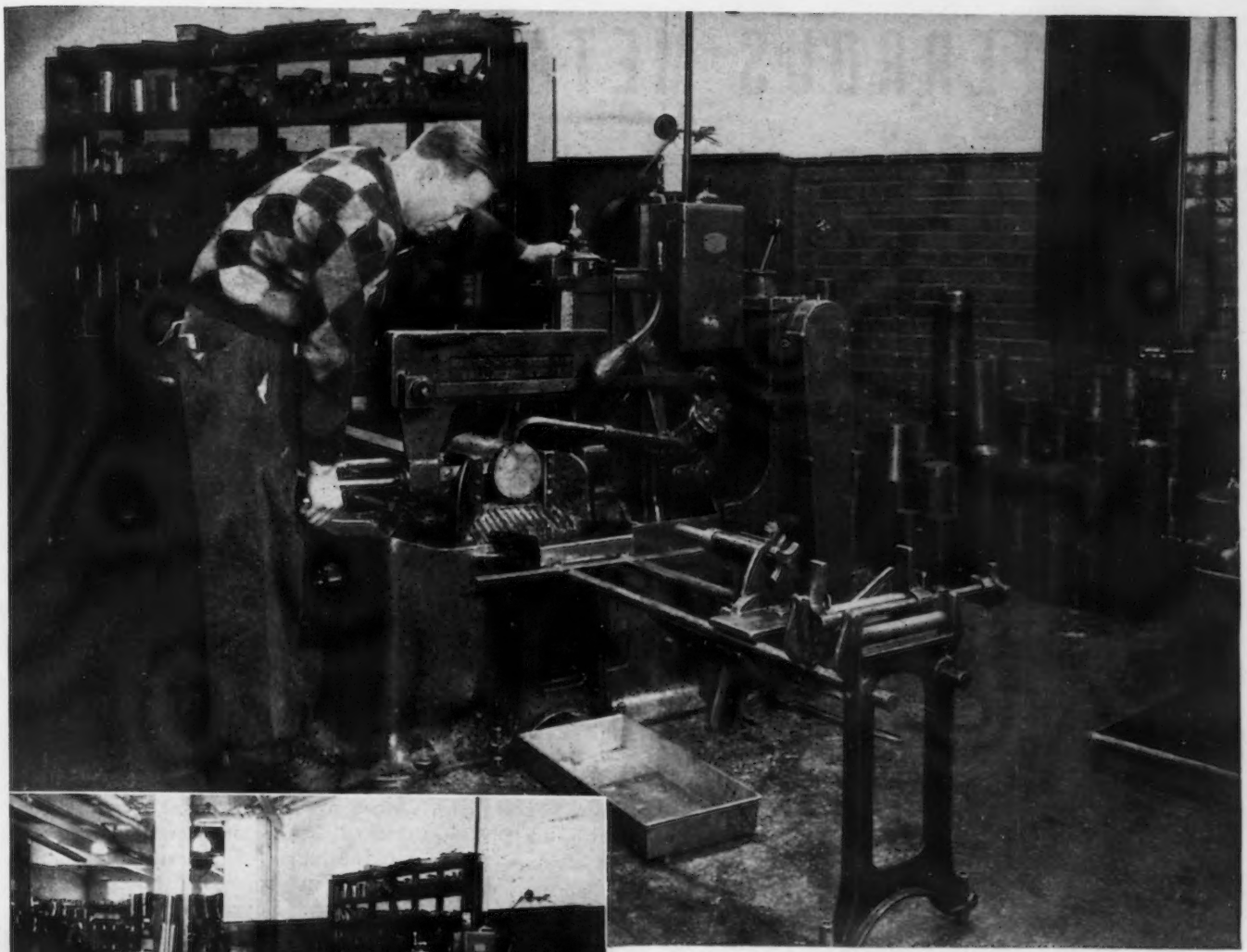
Such charges would be hard to deny in many instances, but further analysis of the situation in so far as the machine tool builders are concerned gives considerable evidence to the fact that the procedures at the present time are justifiable. Machine tool builders now in the process of cleaning up machine tool orders undoubtedly cannot fully utilize the entire shop personnel. However, these same builders are quickly converting their plants over to production of war material other than machine tools, mostly on a subcontracting basis. It is unquestionably during this conversion period that complaints occur.

From the builders' standpoint, it is impossible to handle the situation otherwise. Workers cannot be kept fully occupied on existing machine tool orders, and subcontracts cannot be obtained and set into production overnight. For the War Manpower Commission to get worried about a situation that is temporary shows that it does not fully understand the situation.

A definite case in this regard is the Warner & Swasey Co., Cleveland, which is acting as subcontractor for 20 companies engaged in war production, according to Charles J. Stilwell, president. Production started to slacken on machine tools for this company several months ago. There was a period before full production on subcontracts was inaugurated when W. & S. workers likewise would have had cause to complain that they weren't being fully utilized. Now, however, equipment for which Warner & Swasey is turning out parts include airplane engines, submarines, diesel engines, power plants for destroyers, torpedoes, jacks for bomb loading, chemical bombs, bun turrets, electric ship hoists and motors. The company is making drive shaft bearings, valves, oil retainers, armature disks, throttling gears, locking pins, cylinder heads, bushings, engine blocks, etc.

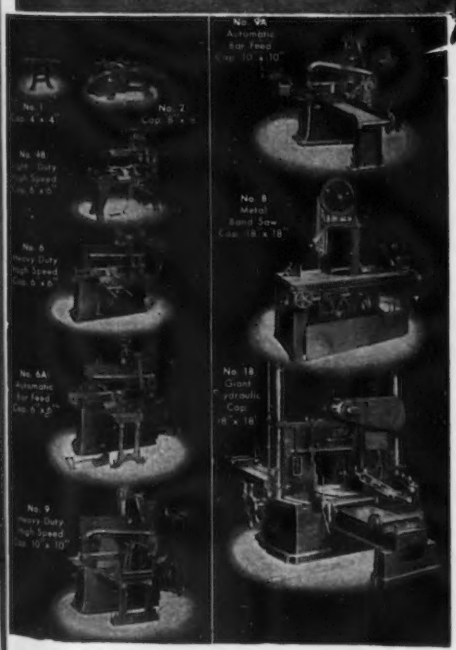
Warner & Swasey with greatly expanded capacity was among the first machine tool builders to find itself with open production capacity, but plant personnel was retained until this open capacity was in use. There are other builders who have not yet obtained subcontracts sufficient to utilize the full capacity of their plants, but they will do so and must at all possible costs hold onto existing shop personnel.

Subcontract work of the nature being done by Warner & Swasey will likely keep every machine tool builder engaged until the end of the war.





MARVEL SAWS



Cutting-off continuously at high speed at Wright Aeronautical Corporation.

Since the start of the National Defense Drive, and now under war production, these MARVEL PRODUCTION SAWS at the Wright Aeronautical Corporation, Paterson, N. J., have operated continuously; have been cutting-off "round and square stock, all kinds of alloy steel up to 10" D., and 10" Sq. and giving A-1 satisfaction."

When photographed, the MARVEL 9A was cutting-off S.A.E. 3140 Steel Tubing, $3\frac{1}{8}$" O.D. x $1\frac{7}{8}$" I.D. at the rate of a piece every minute and a half, while the MARVEL 6A was cutting a slice from a $5\frac{1}{2}$" D. Cold Rolled Steel bar every six minutes. These heavy duty all ball-bearing saws with automatic bar push-up, will cut-off more pieces, floor-to-floor, than any other hack sawing machine.

ARMSTRONG-BLUM MANUFACTURING COMPANY

"THE HACK SAW PEOPLE"

5700 Bloomingdale Ave. Chicago, U. S. A.

Eastern Sales Office: 225 Lafayette St., New York

NON-FERROUS METALS

. . . News and Market Activities

CMP Rules for Aluminum Clarified

Washington

• • • **WPB has moved** to clarify the CMP regulations governing acceptance of purchase orders for aluminum products in the form of controlled materials (except ingot) and to reduce the amount of reporting with respect to orders which are to be delivered later than the requested delivery date. Direction No. 23 to CMP Regulation 1, announced last Friday, states once more that a producer must refuse orders for delivery of aluminum products, including authorized controlled materials orders and orders covered by aluminum-magnesium authorization numbers, unless he expects to be able to make delivery in the month specified in the order.

Producers must refuse orders for aluminum products covered by their production directives when the total orders scheduled for delivery in the month requested equal 110 per cent of the amount of such product authorized in their production directives.

Orders for aluminum products not covered by a production directive must be refused when the producer's total orders for the product equal 105 per cent of his total expected production for the month in which delivery is requested.

If unable to make delivery in the calendar month requested, producers may fill the order at any time during the calendar quarter or during the first month following the calendar quarter, without reporting the fact to WPB or receiving another allotment number. If unable to deliver at all during this period of time, he must, by the last day of the quarter for which the order was accepted (Aug. 15 for second quarter orders not shipped) notify the Aluminum and Magnesium Division in writing of such fact.

When a producer finds that he is unable to make delivery in the month requested, he is required by Director 23 to give the order a place in his production schedule and to fill it ahead of all orders requesting delivery in any month after the requested delivery month shown on the order.

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Wire Mill Products Still Available

Washington

• • • **The WPB Durable Goods** Division last week pointed out that brass and copper wire mill products are available through the Copper Recovery Corp. for manufacturers using copper or copper base alloy materials in the production of permitted civilian goods. The board said that frozen or excess inventories of these products lie unused in manufacturers' hands, and can be used in their present form.

Lists of quantities and kinds are available at WPB regional offices. If the manufacturer has specific requirements, he should write directly to the Copper Recovery Corp., 200 Madison Avenue, New York. PD-595 is available for submitting requests but does not have to be used if all relevant information is contained in a letter. The manufacturer should state his CMP allotment number, together with the weight, description, size and alloy of the material he requires.

Cleveland

• • • **Early returns indicate** that industry is cooperating enthusiastically with the WPB's current campaign to "Share the Copper." Within the WPB fifth region, the first preliminary accounting disclosed that 455,910 lb. of vitally needed copper have been turned back voluntarily from allotments.

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Tin—Bolivia and Alabama

• • • **Bolivian tin** shipments continue to run considerably below quotas, with 1943's first six months coming up to only 77.4 per cent of the standard set, 18,108 tons having been shipped against a 23,384-ton quota. Exports of concentrates during June were the equivalent of 2975 metric tons of fine tin, an increase of 918 tons over May, but a decrease of about 400 tons compared with June of a year ago.

A loan of $30,000 has been made by the RFC to Mineral Concentrates, Inc., for investigating whether the tin deposits in Coosa County, Alabama, are capable of commercial development. So far, investigations by RFC engineers are reported not to have proved anything one way or the other.

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Permanent Stockpiling Urged

• • • **With the fear** that metal markets will be demoralized upon the ending of the war, the brass, bronze and zinc industry have gone on record as favoring government stockpiling as a permanent thing. The Defense Council of the Ingot Brass and Bronze Industry meeting in New York last week adopted a resolution that the government have ingot makers convert scrap into standard ingots and that these ingots be frozen by the government.

In the meantime, the American Zinc Institute has released a statement endorsing permanent government stockpiling, pointing out that when peace comes, zinc concentrates, slab zinc and zinc scrap inventories in the hands of government departments and agencies, including the Army and Navy, and all zinc products under contract to them, will undoubtedly represent a very large tonnage in comparison with normal market requirements. "When there is added to this tonnage the producers' and consumers' stocks and zinc in process," says the Institute, "the aggregate tonnage involved may well represent several years of normal output."

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Brief Notes:

• • • **Maximum price** regulation No. 2, aluminum scrap and secondary aluminum ingot, was amended Aug. 3, extending the expiration date for the carrying out of contracts entered into prior to June 23 at prices in conformance with Revised Price Schedule No. 2. The expiration date, formerly July 23, has been extended to Aug. 23. . . . Producers of permitted civilian goods are reminded by the Consumers' Durable Goods Division, WPB, that brass mill and copper wire mill products are available through Copper Recovery Corp. . . . Plans for wood aircraft have been dropped by the War Department with increased aluminum production given as the reason. Contracts for C-76 wooden cargo planes, including those held by the Higgins Co. at New Orleans, have been cancelled in favor of "highly successful" metal cargo types.

Refiner, Smelter Quotations

(Cents per lb.)

Copper, electrolytic, Conn. Valley	12.00
Copper, electrolytic, New York	11.75
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, virgin 99+%, delivered	15.00
Nickel, electrolytic, base refinery	35.00
Magnesium, 99.9+%, carlots	21.50
Magnesium, 12-in. sticks, carlots	30.00
Cadmium, delivered	90.00

ALUMINUM, No. 12 foundry grade (No. 2), 13.50c. per lb.; steel deoxidizing grades, 12.50c. to 13.75c. per lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. Laredo, Tex., smelter. MERCURY, $191 to $193 per 76-lb. flask, f.o.b. shipping point or port of entry. BRASS INGOTS, commercial 85-5-5-5 (No. 115), 12.25c. a lb. COBALT, 97 to 99 per cent, $2.11 per lb. BERYLLIUM COPPER, 3.75 to 4.25 per cent Be., $15 per lb. contained Be. GOLD, U. S. Treasury, $35 an oz. INDIUM, 99.5 per cent, $10 per troy oz. IRIDIUM, $165 per troy oz. PALLADIUM, $24 per troy oz. PLATINUM, $35 per oz. SILVER, open market, New York, 44.75c. per oz. ARSENIC, prime, white, 99 per cent, 4c. per lb.

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; red brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c., 95 per cent, 21.28c.; manganese bronze, 28.00c.; muntz metal, 22.75c.; naval brass, 24.50c.; phosphor bronze, grades A, B, 5 per cent 36.25c.; Everdur, Herculoy, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.37c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c., 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculoy, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall; 2S, 40c. per lb. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, finish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb. base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity extras.

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Variation from the above size, temper, finish and quantity require extras.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c. a lb.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus premiums for quantities and special preparation.)

OPA Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.25[1]
	6.25[2]
Manganese bronze borings	6.50[1]
	5.50[2]

OPA Group 4

Automobile radiators	7.00

OPA Group 5

Refinery brass	5.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of ½c. a lb. For lots over 19,999 lb. add 1½c. a lb. to prices listed.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cents per lb., f.o.b., shipping point.)

New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
Old zinc scrap	5.75
Unsweated zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under ½ per cent, 26c. per lb.; 90 to 98 per cent nickel, 23c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25½
Electrolytic, full size	22⅞c.
cut to size	30½
Rolled, oval, straight, 15 in. and longer	23¼
Curved	24¼
Brass: Cast, 82-20, elliptical, 15 in. and longer	23⅝
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00–13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz. lots	40.32–41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc sulphate, 89% crystals, bbls.	6.80

SCRAP

. . . News and Market Activities

Fears Due to Live Ammunition Deflated

New York

• • • **Reports concerning** the dangers of live ammunition in battlefield scrap are untrue, Army authorities said this week. Furthermore, steps are being shaped to make any fears entirely unthinkable.

An explosion in an eastern open hearth last week resulted in the deaths of two workmen and blew the furnace out. Rumors started, blaming the accident upon unexploded ammunition in battlefield scrap. It was recalled that several weeks earlier an explosion occurred in an eastern scrap yard while a workman was cutting a piece of steel plate, reportedly due to a shell lodged under the plate.

Government agencies promptly began an investigation late last week. The consensus of the investigators Monday was that battlefield scrap could not be blamed. It was said that while the eastern steel plant had received some battle scrap, it was not being charged at the time of the explosion and neither was domestic munitions scrap being used. One authority expressed the belief the accident was caused by water.

"Not a bit of truth in the rumors," an Army authority told THE IRON AGE. "We have investigated and are certain it was not battlefield scrap nor domestic munitions scrap that caused the explosion. Demolition squads carefully examine all material from combat areas."

In iron and steel scrap circles it was said letters had been sent out cautioning yard operators in the handling of the heterogeneous material.

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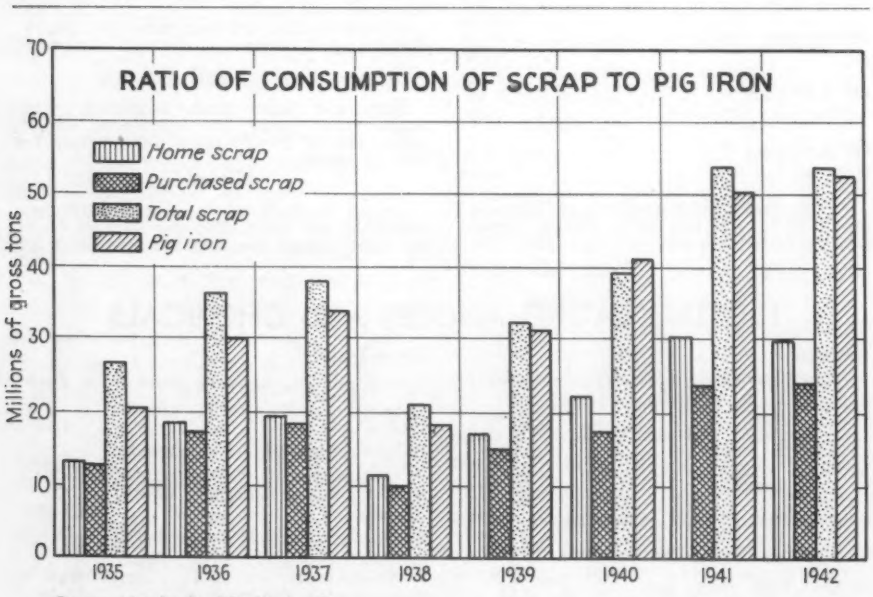
New England Asked to Collect Additional Scrap

• • • **John D. Orr,** government regional salvage manager for New England has asked New England to collect 99,500 tons more of scrap metal between now and Dec. 31 than it did in 1942, and 114,500 tons more than it did between Jan. 1 and June 30 this year.

Massachusetts is asked to increase its collections as compared with the first six months—62,500 tons; Maine, 6,000 tons, Rhode Island, 18,500 tons; Connecticut, 28,500; Vermont, 1,000 tons less. No more or less is expected from New Hampshire. Following are tonnages expected the last half of 1943, actual collections the first half and 1942 collections in 1942, figures in tons:

	Last Half	First Half	1942
Maine	85,000	79,000	51,000
New Hampshire	25,000	25,000	16,000
Vermont	28,000	29,000	16,000
Massachusetts ..	377,500	315,000	391,000
Rhode Island...	82,500	64,000	68,000
Connecticut ...	349,500	321,500	306,000

Mr. Orr says the bulk of scrap will have to come from manufacturing plants, general industry and special projects such as bridges and abandoned rails. The government does not anticipate much scrap from householders.



Source: Yearbook of Institute of Scrap Iron and Steel, Inc.

•

Scrap Yard Wage Rates Raised in Pittsburgh Area

Pittsbugh

• • • **Wage rates** in Pittsburgh district yards which are members of the Tri-State Scrap Yard Dealers' Assn. have been raised on application of the association to the WLB. The increased rates, effective as of last March 1, are as follows: Common laborers, 55c. per hour; drivers, 65c.; burners, 75c.; shear men, 65c.; crane riggers, 80c.; press operators, 60c.; sorters, 65c.; maintenance mechanics and millwrights, 65c.; and foremen, 80c.

These rates are advances of 5 to 10c. an hour over most earlier levels, but are not considered by many dealers as sufficient to enable them to hold their help.

•

West Coast Scrap Plant Completed at Pittsburg, Calif.

• • • **Covering** approximately seven acres and with storage facilities for 50 railroad cars, the California Scrap Iron Corp. has completed its new plant at Pittsburg, Calif., for the preparation of iron and steel scrap for steel mill and foundry uses. Marshall A. Shapiro is president of the company which is a principal supplier to the Columbia Steel Co. and one of the largest scrap operators on the West Coast. Other plants are at Oakland and San Francisco. The U. S. Army engineers commandeered the former property and necessitated installation of new facilities.

•

BUFFALO—Some allocations of Western New York scrap were made to the Youngstown area this week as mill stocks here remained favorable. More scrap was received from the seaboard via barge canal and reports were current that quantities from the Mediterranean battlefields soon would be shipped into Buffalo via the state waterway. Canals operators deny any battlefield scrap has arrived to date, asserting practically all shipments have come directly from a dealer, consisting principally of auto and farm implement stuff. Any battlefield scrap received by barge canal is expected to have been processed and ready for direct delivery to the mills.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
							Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

*Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at $14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. **Pit scrap, ladle skulls, slag reclaim,** etc., of 85% or more Fe priced—$2; 75 to 85% Fe—$4; under 75% Fe—$8 per ton. Mill scale of 65% or more Fe—$8 per ton. **Mill cinder and grindings,** shipping point maximum price of $4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B: switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

BASE PRICE SEGREGATED

	Solids, Lb. Cont. W	Turnings, Lb. Cont. W
Type 1	$1.80	$1.60
Type 2	1.60	1.40
Type 3	1.25	1.25
Type 4*	0.125	0.105
Type 5*	0.135	0.115

*Per lb. of scrap material.

BASE PRICE UNSEGREGATED SOLIDS

$1.50 per lb. contained W if 5% or more.

$1.15 per lb. contained W if over 1% and less than 5%.

$0.80 per lb. contained Mo if 1½% or more.

BASE PRICE UNSEGREGATED TURNINGS

$1.30 per lb. contained W if 5% or more.

$1.00 per lb. contained W if 1% and less than 5%.

$0.70 per lb. contained Mo if 1½% or more.

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Aug. 10, 1943	Aug. 3, 1943	July 13, 1943	Aug. 11, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Aug. 10, 1943	Aug. 3, 1943	July 13, 1943	Aug. 11, 1942
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.89	$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.50	$6.00
Foundry coke, prompt	7.50	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 159-171.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
August 10, 1943	2.25513c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.25513c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.25513c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.26190c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.25513c.,	2.25513c.,	$23.61	$23.61	$19.17	$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

. . . Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
.50 / .75 Electro tin plate, box	$4.50 / $4.65	$4.50	$4.50 / $4.65												
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.37¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢[13]	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢[13]	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)						2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.31¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 29,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	†† Hot Rolled, 2300	‡ Hot Rolled, 3100	†† Cold Drawn, 2300	‡ Cold Drawn, 3100
*Philadelphia	$3.518	$4.872[5]	$5.018	$3.922	$4.772	$3.605	$3.666	$3.822	$4.072	....	$7.116	....	....
*New York	3.590	4.613[2]	5.010	3.974[6]	4.774	3.768	3.758	3.853	4.103	6.008	7.158	7.303	8.453
*Boston	3.774	4.744	5.224	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.312	7.344	8.494
*Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
*Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	....	....	....	....
*Washington	3.596	4.841	5.196	4.041	4.741	3.796	3.930	3.941	4.041	....	....	....	....
*Chicago	3.25	4.20	5.23[4]	3.60	4.65[8]	3.55	3.55	3.50	3.75	5.75	6.90	6.85	8.00
*Milwaukee	3.387	4.337[2]	5.272[4]	3.737	4.787[8]	3.687	3.687	3.637	3.887	5.987	7.137	7.087	8.237
*Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
*Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
*Detroit	3.45	4.50	5.00[4]	3.70	5.909[8]	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.309
*Cincinnati	3.425	4.475[2]	4.825[1]	3.675	4.711	3.611	3.691	3.611	4.011	....	....	....	....
*St. Louis	3.397	4.247[2]	5.172[4]	3.747	4.931[8]	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
*Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.25
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	6.84	7.44
*Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.443	....	....	....	....
*Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.23	7.18	8.33
Birmingham	3.45[3]	....	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.43	....	....	....	....
Memphis	3.85	4.66	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	3.95	4.95	5.25	4.20	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	3.75	5.43	5.25	4.30	....	5.25	5.25	3.75	4.50	....	....	....	....
†Los Angeles	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
†San Francisco	4.55	7.55	6.60	4.50	....	4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
†Seattle	4.65[7]	6.63	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	8.00	....	....

NATIONAL EMERGENCY (N. E.) STEELS

(Hot Rolled Mill Extras for Alloy Content)

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35	....	....	....	.10c	$2.00	....	....
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35	....	....	....	.10	2.00	....	....
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35	....	....	....	.10	2.00	....	....
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35	....	....	....	.10	2.00	....	....
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35	....	....	....	.10	2.00	....	....
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35	....	....	.10/ .20	.45	9.00	.95c	$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35	....	....	.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20	....	....	....	.40c	8.00	....	....
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20	....	....	....	.40	8.00	....	....
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40	....	....	.65	13.00	....	....
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60	....	....	.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60	....	....	.80	16.00	1.30	26.00
NE 9637	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	....	....	.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	....	....	.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60	....	....	.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60	....	....	.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60	....	....	.85	17.00	1.35	27.00

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over: Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. [8] 2000 to 39,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

†† For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'ld.

* Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

***Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, $5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.**

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; f.o.b. Duluth, billets only, $2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 202
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.



It will take the combined efforts of all Americans to help the mills produce the 90 million tons of steel required in 1943. To attain this goal, 45 million tons of scrap metal are needed. That's why a continuation of the scrap drive is imperative. Any relaxation would prolong the war and threaten ultimate victory. We can't afford to have this happen. So, salvage all the scrap you can. Sell it to a dealer who will send it to the mills for processing. *Do your share to keep the steel mills of America operating continuously, and at peak production.*

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

"HERCULES" RED-STRAND WIRE ROPE
REG. U.S. PAT. OFF.

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

SET SCREWS of any size or style you need are made by CLEVELAND
Cup·Oval·Cone·Flat·Dog



● Besides your advantage of being able to secure a wide range of styles and sizes in square head or headless Cleveland Set Screws, the assurance of quality is important. Made to close tolerances—Class 3 fit—carefully case hardened—high tensile strength—they meet the most rigid requirements. Write for samples and prices.

THE CLEVELAND CAP SCREW COMPANY
2917 EAST 79TH STREET • CLEVELAND, OHIO

Cleveland Cap Screws
Set Screws and Special Upset Parts
Made by the Originators of the Kaufman Process for Greater Strength and Accuracy
Specialists for 26 years in Headed and Threaded Products

WAREHOUSES
CHICAGO: 726 W. Washington Blvd.
PHILADELPHIA . . 12th & Olive Sts.
NEW YORK. . . . . 47 Murray St.
LOS ANGELES . . . 1015 E. 16th St.

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets *(7/16 in. and smaller)*

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) *Per Lb.*

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

	Black	*Galv.*
Steel (Butt Weld)		
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

Why Manganese Steel Gears are *Heavy Industry's Best Buy*

Gears and pinions in heavy power transmission work are usually subjected to severe shock loads along with exposure to gritty particles that cause rapid wear in ordinary ferrous metals. The successful performance of various kinds of equipment depends, to a large extent, on the ability of the gears and pinions to stand up under heavy loads and to resist the wearing action of abrasive materials. There are several reasons why manganese steel gears and pinions are most economical for this service.

1st—They will withstand, without breakage, shock stresses that would cause gears made of other materials to fail.

2nd—Manganese steel gears will resist the wearing action of gritty materials.

3rd—The strength of manganese steel is not necessarily associated with bulk. In many cases, castings may be lightened by coring, and still exceed in stamina heavier parts of common steel or iron.

Why Manganese Steel Gears Will Stand Shock Loads

In substance, all metals are composed of many minute particles or grains. Their resistance to breakage is dependent upon the ability of these particles to adhere to one another. If you were to examine the structure of manganese steel, you would find a metal of great density, where the particles are more closely combined than in ordinary steel. The grains are so tightly held together that great shocks and stresses can be sustained without pulling apart or fracturing the structure.

Why Manganese Steel Gears Will Resist Wear

Under abrasive or frictional wear, the teeth of manganese steel gears and pinions assume a high polish, reducing friction. Because of its dense structure, manganese steel is able to retain this smooth surface at the points of contact, and the abrasive process is retarded rather than accelerated as it goes on.

This polished surface of manganese steel acts like a good lubricant in overcoming wear. Sharp dust, grit, and other abrasive materials find it hard to get a footing on the slippery surface of this close-grained metal. Where oil and grease would only form means of attachment for the grinding particles in the surrounding air, manganese steel gears and pinions run smoothly without a lubricant of any kind. This inherent self-lubricating quality adds to the value of austenitic manganese steel as an abrasive resistant metal.

R-830 — Girth gear, 117 tooth, 74.484" p.d., 5" face, 1025 lbs., soft steel inserts cast in for customer to drill holes. Gear was cast in one piece and split afterwards for ease of assembly. It is a drive gear for rotary dryer handling raw materials for abrasive wheel manufacture.

Our picture is typical of many types and sizes of gears we have been making for thirty years for the heavy-duty equipment of America's manufacturing industries.



Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.00*	*$24.50*	*$26.00*	*$26.50*	.....	.....
Brooklyn	*27.50*	.....	.....	*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	*23.94*	*23.94*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.69*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.46*	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*22.42*	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	*22.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	.....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

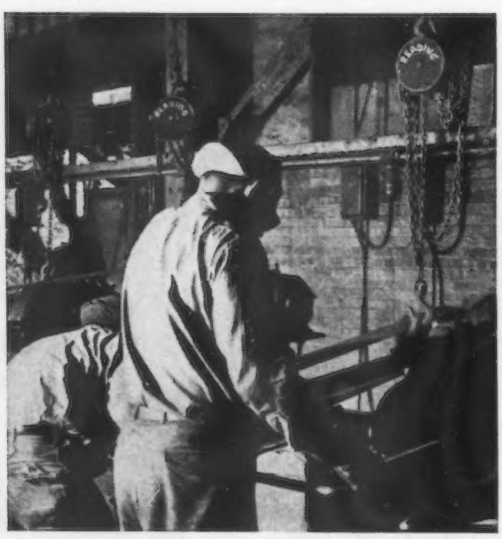
†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $2 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge $30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

This Chain Hoist gives you 3 ADVANTAGES!



Three of a steel mill's battery of READING CHAIN HOISTS in the grinding department.



● Catalog No. 58 will give you the kind of useful information you need when selecting chain hoists. For your free copy, drop us a note on your company letterhead.

Long time service! Speed with real safety! Easy maintenance!

For ALL of those features specify READING CHAIN HOISTS. They are engineered to stay on the job shift after shift. Maintenance consists of regular oilings. There is a READING CHAIN HOIST for practically every lifting job in your plant — from ½ to 20 tons.

Reading Chain & Block Corporation, 2101 Adams St., Reading, Pa.

READING CHAIN HOISTS·ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21⅛ to 23⅛c.
Copper, reduced, 150 and 200 mesh	20½ to 25⅛c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer	4c.
Iron, hydrogen reduced, 300 mesh and finer	63c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh.	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh,	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51⅛c.
Solder powder, 100 mesh,	8½c. plus metal
Tin, 100 mesh	58¾c.

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

			Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
2	in. o.d.	13 B.W.G.	15.03	13.04	12.38
2½	in. o.d.	12 B.W.G.	20.21	17.54	16.58
3	in. o.d.	12 B.W.G.	22.48	19.50	18.35
3½	in. o.d.	11 B.W.G.	28.37	24.62	23.15
4	in. o.d.	10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago.....$54.80
6-in. and larger, del'd New York... 52.20
6-in. and larger, Birmingham 46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles..... 69.40
6-in. and larger f.o.b. cars, Seattle. 71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

Per Gross Ton

Old range, bessemer, 51.50 .....$4.75
Old range, non-bessemer, 51.50 ..... 4.60
Mesaba, bessemer, 51.50 ..... 4.60
Mesaba, non-bessemer, 51.50 ..... 4.45
High phosphorous, 51.50 ..... 4.35

*Adjustments are made to indicated prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

COKE

Furnace

Per Net Ton

†Connellsville, prompt $6.50*

Foundry

†Connellsville, prompt $7.50
Fayette County, W. Va. (Beehive). $8.10
By-product, Chicago $12.25
By-product, New England $13.75
By-product, Newark .....$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis $12.02
By-product, Buffalo $12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.

*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

Pursuant to OPA Revised Maximum Price Regulation No. 126, effective July 1, 1943, to Aug. 29, 1943, base price per short ton is set at $33 for 70 per cent or more effective CaF_2 content; $32 for 65 but less than 70 per cent; $31 for 60 but less than 65 per cent; and $30 for less than 60 per cent. F.o.b. consumer's plant (1) plus either railroad freight on such shipment from the producer's shipping point to the consumer's plant, or (2) railroad freight on such a shipment from Rosiclaire, Ill., to the consumer's plant, which ever is lower. On and after Aug. 30, 1943, the maximum price f.o.b. a consumer's plant on any shipment of metallurgical grade fluorspar shall be $30 per short ton. Over $30 may be charged provided the producer receives specific instructions from the Steel Division of WPB to the effect that a specific consumer must have one of the higher grades, as provided in Section No. 4 (b).

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis $64.60
First quality, Pa., Md., Ky., Mo., Ill. 51.30
First quality, New Jersey 56.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 46.55
Second quality, New Jersey 51.00
No. 1, Ohio 43.00
Ground fire clay, net ton 7.60

Silica Brick

Pennsylvania & Birmingham $51.30
Chicago District 58.90
Silica cement, net ton (Eastern).. 9.00

Chrome Brick *Per Net Ton*

Standard, chemically bonded, Balt., Plymouth Meeting, Chester $54.00

Magnesite Brick

Standard, Balt. and Chester $76.00
Chemically bonded, Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads) $44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00



PERFORATED METALS



★

Any Metal

Any Perforation

For INDUSTRIAL purposes a great variety of sizes and shapes of perforations are required, ranging from very fine to as large as 6" or more in diameter. We are equipped to supply all standard perforations in all kinds and thicknesses of metals.

ORNAMENTAL patterns are covered by our grille catalog. If interested, we hope you will send for it. There are attractive patterns for different uses.

5657 FILLMORE ST., CHICAGO 44 • 114 LIBERTY ST., NEW YORK 6

The Harrington & King PERFORATING Co.

C-F

POSITIONERS

Cut Welding Time

Reduce Welding Cost

Improve Welding Quality

All sides, top and bottom, are welded downhand with one set-up. No waiting for the crane, no "handling" crew needed, for the welder himself rotates (360°) and tilts weldment (to 135° beyond horizontal) with a push button control. This "all-down," hand welding method permits use of larger rods, hence requires fewer passes and gives stronger, smoother, more uniformly flawless seams and joints.

C-F Positioners, pedestal mounted and adjustable for height, come in 6 capacities—from 1200 lbs. to 30,000 lbs. Manual, motorized or motorized variable speed operation.



Write for Bulletin WP-22



CULLEN-FRIESTEDT CO.,
1303 S. KILBOURN AVE. CHICAGO, ILLINOIS

BRONZE BEARINGS
OILLESS BRONZE BEARINGS
GEAR BLANKS
MACHINED BRONZE PARTS

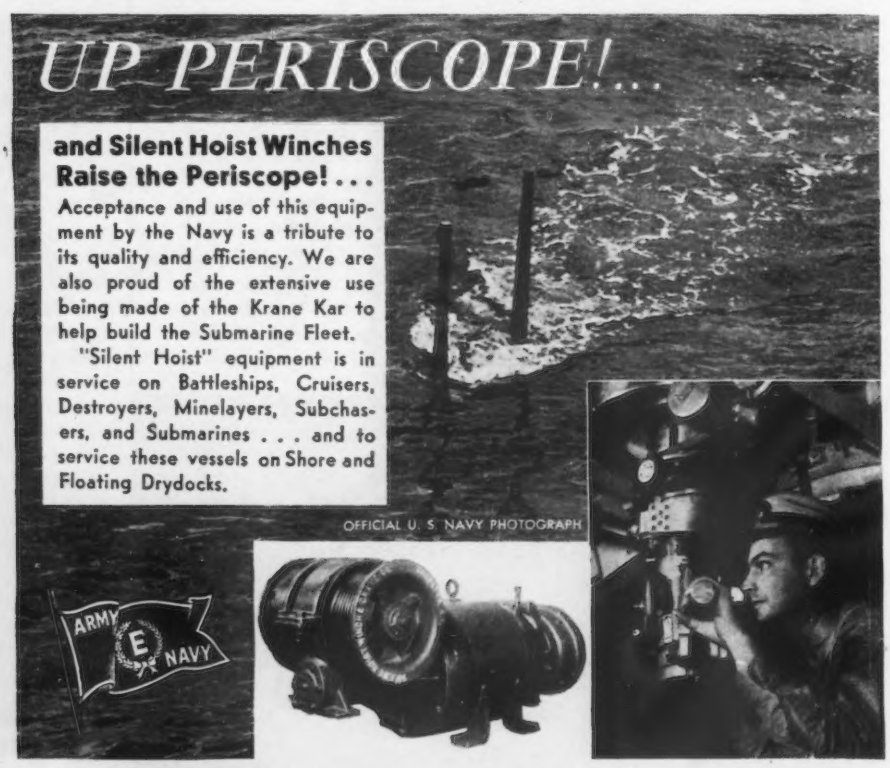
S & H Bronze Bearings can be furnished in any size or quantity to meet your particular requirements.

Our equipment and manufacturing methods enable us to meet the most exacting specifications and design.

BETTER B BEARINGS

INDUSTRIAL BEARINGS

S. & H. Bearing and Manufacturing Co., Inc.
340-344 North Avenue, East
Cranford New Jersey



2½, 5, AND 10 TON CAPACITIES

Krane kar

SILENT HOIST WINCH & CRANE CO., 851 63RD ST., BROOKLYN, N.Y.

Ferromanganese

78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Ton lots (packed)	141.00
Less ton lots (packed)	148.50

Premium, $1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Electrolytic Manganese

99.9% manganese, maximum base contract price per lb. of metal, bulk, f.o.b. shipping point, with freight allowed to destination. Size, 1" x D.

	Eastern Zone	Central Zone	Western Zone
Carload lots	37.60c.	37.85c.	38.15c.
l.c.l. lots...	39.60c.	38.60c.	40.65c.

Spiegeleisen

Maximum base contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 1% max. Si	19-21% Mn 1% max. Si	26-28% Mn 1% max. Si
Carloads	$41.00	$42.00	$55.50
Less ton	47.50	48.50	62.00

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% silicon	6.65c.	7.10c.	7.25c.
75% silicon	8.05c.	8.20c.	8.75c.

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio	$29.50*
Buffalo	30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car Lots ...	3.35c	3.50c.	3.65c.

Spot prices ¼c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(Per gross ton, delivered, carloads, bulk)

3.00 carbon	$120.00*
2.50 carbon	125.00*
2.00 carbon	130.00*
1.00 carbon	140.00*
Briquets, contract, basis carlots, bulk freight allowed, per lb...	5.80c.†
Packed	6.05c.†
Less-ton lots	6.55c.†

*Spot prices are $5 per ton higher.
†Spot prices ¼c. higher.

Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carlots, f.o.b. shipping point, freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon ..	25.00c.	25.40c.	26.00c.
0.06% carbon ..	23.00c.	23.40c.	24.00c.
0.10% carbon ..	22.50c.	22.90c.	23.50c.
1.00% carbon ..	20.50c.	20.90c.	21.50c.
2.00% carbon ..	19.50c.	19.90c.	20.50c.

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

Other Ferroalloys

Ferrotungsten, delivered, carlots, per lb. contained tungsten ...	$1.90
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Ferrovanadium, 35%-40%, contract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. contained vanadium	$2.70
Special grade	$2.80
Very special grade	$2.90
Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5	$1.10
Ferroboron, contract basis, 17.50 % boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy	$1.20
Ton lots	$1.25
Silcaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per pound contained boron....	$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium ..	$2.25
Less-ton lots	$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium	$1.23
Less-ton lots	$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	$1.35
Less-ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore & St. Louis, per gross ton.	$142.50
3%-5% carbon	$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala. carlots, with $3 unitage freight equaled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.....	80c.
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Less-ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton.	$102.50
Packed	$107.50
Less-ton lots	$112.50
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb. ...	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn. 20% Al), contract basis, carlots, f.o.b. Phila., Ohio, per lb. ton lots	9.50c.
Less-1 ton lots	10.50c.

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